United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Virginia Polytechnic
Institute and State
University

Soil Survey of Pittsylvania County and the City of Danville, Virginia

How To Use This Soil Survey

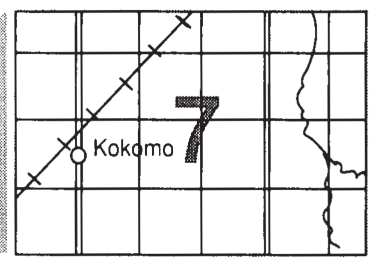
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

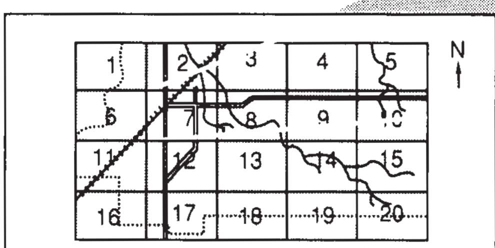
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



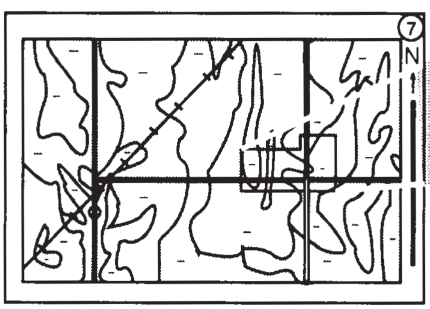
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

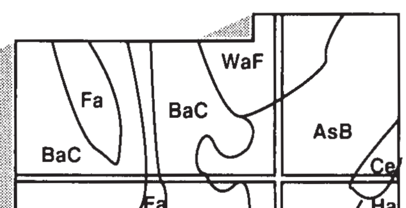


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1989. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Soil Conservation Service and the Virginia Polytechnic Institute and State University. The Virginia Department of Conservation and Recreation, the Pittsylvania County Board of Supervisors, and the Danville City Council provided financial assistance. The survey is part of the technical assistance furnished to the Pittsylvania Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Irrigated tobacco in an area of Mayodan fine sandy loam, 2 to 7 percent slopes.

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Issued July 1994

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in the survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

George C. Norris
State Conservationist
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Soil Survey of Pittsylvania County and the City of Danville, Virginia

By John C. Nicholson, Soil Conservation Service

Fieldwork by Rim Gardner, Herbert L. Gillispie, Susan J. Hoey, Richard D. Jones, Peter Kesecker, and John C. Nicholson, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with
Virginia Polytechnic Institute and State University

This survey area is in the southern part of Virginia (fig. 1). It is bounded on the north by the Roanoke River and Campbell County, on the east by Halifax County, on the west by Franklin and Henry Counties, and on the south by Rockingham and Caswell Counties, North Carolina. Its greatest length from north to south is 40 miles, and its greatest width from east to west is 28 miles. Pittsylvania County is the largest county in the State. It has a land area of about 640,300 acres. The city of Danville has a land area of about 11,000 acres. U.S. Highway 29 runs north to south through Pittsylvania County, passing through Hurt, Gretna, Chatham, and Danville. U.S. Route 58 runs east to west, passing through Danville. U.S. Highway 360 connects Danville and Richmond. Virginia Highways 40 and 57 pass through the county in an east-west direction.

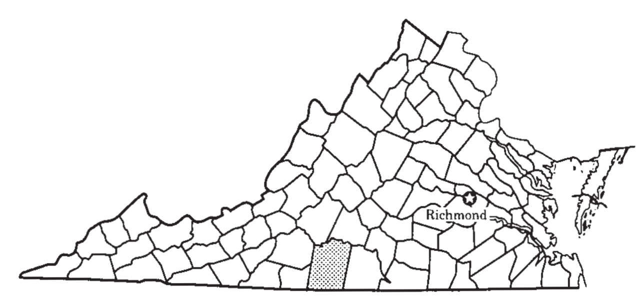

Figure 1.—Location of Pittsylvania County and the City of Danville in Virginia.

General Nature of the Survey Area

This section provides general information about the survey area. It describes history; physiography, relief, and drainage; water supply; industry; and climate.

History

Settlement of Pittsylvania County began about 1740 with the arrival of pioneers from the Tidewater of Virginia. At that time, the county was part of Lunenburg County. The population grew large enough for the formation of a new county by 1767. Pittsylvania County was then separated from Halifax County, which had been separated from Lunenburg County in 1752. Pittsylvania County was named in honor of William Pitt, statesman and Earl of Chatham. In 1777, the county seat was established at Chatham, a centrally located town also named for William Pitt.

In 1728, William Byrd headed an expedition to determine the true boundary between Virginia and North Carolina. The party camped upstream from what is now Danville. The river along which Byrd's party camped was named the "Dan." In 1792, the first white settlement in the vicinity of Danville was established

downstream from Byrd's campsite, at a spot where the river was shallow enough to be crossed. The settlement was originally named "Wynne's Falls," after the first settler. It was renamed "Danville" in 1793. Danville became a city in 1890.

By 1850, after the completion of the Richmond-Danville Railroad and the Danville-Lynchburg Turnpike, the survey area became a leading trade center. Tobacco dominated the market until it was joined by cotton products in the 1880's. Timber and grain soon also became important trade commodities.

The rail facilities in Danville played an important part in the Civil War when the Danville-Greensboro line became Virginia's only connection with the other Confederate States. The last meeting of the Confederate Cabinet was held in Danville, in the Sutherline Mansion, which has been preserved and now houses the Danville Museum of Fine Arts and History.

Physiography, Relief, and Drainage

This survey area is completely within the Piedmont Physiographic Province *(3)*. The geologic features of the area are quite old, except for the Triassic Basin.

The survey area is well dissected by streams *(4)*. It has wide or narrow, undulating to rolling interstream divides. Areas near the larger streams are steep. The Triassic Basin, which extends across Pittsylvania County from the northeast corner to the southwest corner, generally is lower than the rest of the county *(5)*. The interstream divides in this basin generally are wide and are nearly level to undulating. They are rolling to hilly around White Oak Mountain. Smith Mountain, which is in the northwestern part of the county, is hilly to very steep.

Elevation generally ranges from 600 to 1,000 feet in the northern and western parts of the survey area and from 400 to 800 feet in the southern and eastern parts. It generally is about 500 to 700 feet in the Triassic Basin. It is more than 1,000 feet on top of White Oak Mountain. The highest elevation in the survey area, 2,038 feet, is on top of Smith Mountain. The lowest, about 350 feet, is in an area where the Dan River flows into Halifax County.

Most of the survey area is drained by the Dan River and by the Banister River, which eventually flows into the Dan River in Halifax County. The northern and northwestern parts of the survey area are drained by the Roanoke River, which flows generally in an eastward direction and is the northern county line. The Dan River flows generally in an eastward direction, winding back and forth across the North Carolina line. It drains the southern part of the county. The Banister River, which flows northeastward and then southeastward, drains the central part of the survey area. Some of the creeks in the eastern part of the area flow into Halifax County before entering the Dan or Banister River.

Water Supply

Numerous springs and creeks supply ample water for livestock on nearly all of the farms in the survey area. Domestic household supplies are drawn from springs or wells. Until recent years, nearly all farm wells were dug. The majority of the newer wells are drilled. Most of the drilled wells are 80 to 150 feet deep and yield an average of about 15 gallons per minute. Some of the wells yield more than 25 gallons per minute. Most of the ground water is soft and of good quality.

The source of municipal water for Danville is the Dan River. The source for Gretna is George's Creek, and the source for Chatham is Cherrystone Creek.

The Roanoke, Dan, Sandy, Banister, and Pigg Rivers, Smith Mountain Lake, and Leesville Lake can furnish large supplies of surface water. Two watershed lakes near Chatham can supply water to Chatham. Many private ponds on small watersheds provide water for livestock, irrigation, and recreation.

Industry

The principal sources of employment in the survey area are agriculture and services related to the processing and marketing of agricultural products. These services include livestock auctioning and grading, tobacco marketing and processing, milk processing, manufacturing of veneer plywood and fertilizer, and milling. Danville is the largest agricultural and marketing center in the State.

Manufacturing is centered in the Danville area, where the largest single-unit textile mill in the world is located. The products manufactured in the Danville area include not only agricultural products but also cotton and rayon fabrics, sheets and pillowcases, knitwear, hosiery, apparel, tires, cement, building blocks, elevators, machine tools, mobile homes, hand and power tools, paper tubes, business forms, and scientific and industrial glass.

Additional manufacturing in the survey area is centered around Chatham, Gretna, and Hurt. The enterprises in Chatham manufacture cable, plywood, and chemicals; those in Gretna manufacture shoes and textiles; and those in Hurt manufacture textiles.

Climate

Prepared by the Virginia Polytechnic Institute and State University.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Danville in the period 1956 to 1985. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 38.4 degrees F and the average daily minimum temperature is 27.4 degrees. The lowest temperature on record, which occurred at Danville on January 21, 1985, is -5 degrees. In summer, the average temperature is 76.2 degrees and the average daily maximum temperature is 87.8 degrees. The highest recorded temperature, which occurred at Danville on August 23, 1983, is 103 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 42.9 inches. Of this, 22.29 inches, or about 52 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18.1 inches. The heaviest 1-day rainfall during the period of record was 4.7 inches at Danville on December 29, 1958.

The average seasonal snowfall is 8.8 inches. The greatest snow depth at any one time during the period of record was 11.0 inches. On the average, 2 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet

local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

Upland Soils Formed in Residuum Derived from Acidic Igneous and Metamorphic Rocks

1. Pacolet-Madison

Gently sloping to steep, very deep, well drained soils that have a clayey and loamy subsoil and are moderately permeable

This map unit is in the northern part the survey area, west of White Oak Mountain. It is on gently sloping to strongly sloping summits, shoulders, and side slopes and on the narrow, moderately steep and steep side slopes of ridges. The soils formed in material weathered from mica gneiss and mica schist.

This unit makes up about 5 percent of the survey area. It is about 65 percent Pacolet soils, 30 percent Madison soils, and 5 percent soils of minor extent.

The Pacolet soils are on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges. Typically, they have a surface layer of dark brown fine sandy loam and a subsoil of red clay and clay loam.

The Madison soils are on the moderately steep and steep side slopes of ridges. Typically, they have a surface layer of brown fine sandy loam and a subsoil of red clay and clay loam.

The soils of minor extent are mainly those of the Cecil, Enott, and Cullen series. They are in areas where bedrock is more deeply weathered or where the less acid bedrock has intruded into the more acid gneiss or schist bedrock.

About 40 percent of this map unit has been cleared. Most of the cleared areas are used for cultivated crops, such as corn, soybeans, and tobacco. Pasture for beef cattle also is a major use. Wooded areas occur mainly as moderately steep and steep soils adjacent to drainageways.

The soils in this map unit are suited to cultivated crops, pasture, and hay. The slope and the potential for erosion are the main management concerns.

These soils are suitable for trees. Timber production is high. The slope is the main limitation affecting the use of logging equipment, especially during wet periods.

These soils are suitable for residential uses. The slope is the main limitation.

2. Mattaponi-Appling-Cecil

Gently sloping to strongly sloping, very deep, well drained soils that have a clayey and loamy subsoil and are moderately permeable or moderately slowly permeable

This map unit is in the southeastern part the survey area. It is on broad, gently sloping to strongly sloping summits, shoulders, and side slopes and on narrow, strongly sloping side slopes along drainageways on ridges. The Mattaponi soils formed in old alluvium over residuum. The Appling and Cecil soils formed in material weathered from granite, granite gneiss, and other acid crystalline rocks.

This unit makes up about 1 percent of the survey area. It is about 35 percent Mattaponi soils, 25 percent Appling soils, 15 percent Cecil soils, and 25 percent soils of minor extent.

The Mattaponi soils are on the gently sloping and

strongly sloping, broad summits, shoulders, and side slopes of ridges. They are moderately slowly permeable. Typically, they have a surface layer of yellowish brown sandy loam and a subsoil of firm, plastic, brown, gray, and red clay.

The Appling soils are on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges. They are moderately permeable. Typically, they have a surface layer of brown sandy loam and a subsoil of yellowish brown and yellowish red clay, sandy clay, and sandy clay loam.

The Cecil soils are on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges. They are moderately permeable. Typically, they have a surface layer of yellowish red sandy clay loam and a subsoil of red clay and clay loam.

The soils of minor extent are mainly those of the Enott, Helena, and Wilkes series. Enott and Wilkes soils are in areas where dark basic bedrock has intruded into acid crystalline bedrock. In many areas they are lower on the landscape than the surrounding soils. Helena soils are generally on broad divides and high, flat summits where runoff does not drain easily.

About 70 percent of this map unit has been cleared. Nearly all of the cleared areas are used for cultivated crops, such as tobacco, corn, and soybeans. Most wooded areas occur as moderately steep and steep soils adjacent to drainageways or as the less productive soils.

Most of the soils in this map unit are suited to cultivated crops, pasture, and hay. The main management concerns are the slope, the potential for erosion, and, in some areas, moderately slow permeability in the subsoil. Because of the restricted permeability, timely cultivation is difficult, especially in spring.

These soils are suitable for trees. Timber production is high. The slope is the main limitation affecting the use of logging equipment, especially during wet periods.

These soils are suitable for residential uses. The slope and the moderately slow permeability in some of the soils are the main limitations.

3. Cecil-Appling-Pacolet

Gently sloping to steep, very deep, well drained soils that have a clayey and loamy subsoil and are moderately permeable

This map unit is in the southeastern part the survey area, east of White Oak Mountain. It is on gently sloping to strongly sloping summits, shoulders, and side slopes and on narrow, strongly sloping to steep side slopes. The soils formed primarily in material weathered from granite gneiss and other acid crystalline rocks.

This unit makes up about 23 percent of the survey area. It is about 30 percent Cecil soils, 25 percent Appling soils, 20 percent Pacolet soils, and 25 percent soils of minor extent.

The Cecil soils are on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges. Typically, they have a surface layer of yellowish red sandy clay loam and a subsoil of red clay and clay loam.

The Appling soils are on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges. Typically, they have a surface layer of brown sandy loam and a subsoil of yellowish brown and yellowish red clay, sandy clay, and sandy clay loam.

The Pacolet soils are on the moderately steep and steep side slopes of ridges. Typically, they have a surface layer of dark brown fine sandy loam and a subsoil of red clay and clay loam.

The soils of minor extent are mainly those of the Rion and Mattaponi series. Rion soils are intermingled with areas of the Pacolet soils on steep and moderately steep slopes. Mattaponi soils are generally on the gently sloping summits of ridges.

About 40 percent of this map unit has been cleared. Most of the cleared areas are used for cultivated crops, such as corn, soybeans, and tobacco. Wooded areas occur mainly as moderately steep and steep soils adjacent to drainageways.

The soils in this map unit are suited to cultivated crops, pasture, and hay. The slope and the potential for erosion are the main management concerns.

These soils are suitable for trees. Timber production is high. The slope is the main limitation affecting the use of logging equipment, especially during wet periods.

These soils are suitable for residential uses. The main limitation is the slope.

4. Tatum-Goldston

Gently sloping to steep, deep and shallow, well drained and somewhat excessively drained soils that have a clayey subsoil or a very channery, loamy subsoil and are moderately permeable or moderately rapidly permeable

This map unit is in the northwestern part the survey area and includes Smith Mountain. It is on the gently sloping to strongly sloping summits, shoulders, and side slopes of ridges; moderately steep and steep side slopes along drainageways; and the strongly sloping to very steep side slopes of Smith Mountain. The soils formed primarily in material weathered from acid phyllite schist.

This unit makes up about 2 percent of the survey

area. It is about 50 percent Tatum soils, 25 percent Goldston soils, and 25 percent soils of minor extent.

The Tatum soils are on the gently sloping to steep summits, shoulders, and side slopes of ridges. They are deep and are moderately permeable. Typically, they have a surface layer of yellowish brown gravelly loam and a subsoil of red silty clay.

The Goldston soils are on the strongly sloping to steep shoulders and side slopes of ridges and mountains. They are shallow and are moderately rapidly permeable. Typically, they have a surface layer of dark yellowish brown very channery silt loam and a subsoil of yellowish brown very channery silt loam.

The components of minor extent are mainly Hiwassee soils and rock outcrops. Hiwassee soils are on the broad summits and foot slopes of ridges, in areas where old river sediments or colluvium from Smith Mountain has been deposited. Rock outcrops are most common on the upper third of the mountainsides and at the head of drainageways.

Most of this map unit is wooded. About 25 percent of the unit has been cleared. Many of the cleared areas are used as pasture for beef cattle. The rest are used for cultivated crops, such as corn, soybeans, and tobacco.

The Tatum soils are suited to cultivated crops, pasture, and hay. The slope, the potential for erosion, and a high content of aluminum are the main management concerns. The soils are very strongly acid and require heavy applications of lime if they are to be productive. Mainly because of the slope, the potential for erosion, and the depth to bedrock, the Goldston soils are not suited to cultivated crops or hay. They are suitable for pasture.

The major soils are suitable for trees. Timber production is high. The slope is the main limitation affecting the use of logging equipment, especially during wet periods. In areas of the Goldston soils, droughtiness and the depth to bedrock increase the seedling mortality rate and the hazard of windthrow.

The Tatum soils are suitable for residential uses, but the Goldston soils are not suitable. The slope and the depth to bedrock are the main limitations.

5. Madison-Cecil

Gently sloping to steep, very deep, well drained soils that have a clayey and loamy subsoil and are moderately permeable

This map unit is in the western part the survey area, west of White Oak Mountain. It is on gently sloping to strongly sloping summits, shoulders, and side slopes and on the narrow, moderately steep and steep side slopes of ridges (fig. 2). The soils formed primarily in material weathered from mica gneiss and mica schist.

This unit makes up about 11 percent of the survey area. It is about 35 percent Madison soils, 25 percent Cecil soils, and 40 percent soils of minor extent.

The Madison soils are on the moderately steep and steep side slopes of ridges. Typically, they have a surface layer of brown fine sandy loam and a subsoil of red clay and clay loam.

The Cecil soils are on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges. Typically, they have a surface layer of yellowish red sandy clay loam and a subsoil of red clay and clay loam.

The soils of minor extent are mainly those of the Ashlar, Enott, Cullen, and Helena series. Ashlar soils are shallower over bedrock than the major soils. They are on the end of ridges and at the base of the slopes. Enott and Cullen soils are in areas where the less acid bedrock has intruded into the more acid gneiss or schist bedrock. Helena soils are in upland depressions and near drainageways.

About 40 percent of this map unit has been cleared. Most of the cleared areas are used for cultivated crops, such as corn, soybeans, and tobacco. Pasture for beef cattle also is a major use. Wooded areas occur mainly as moderately steep and steep soils adjacent to drainageways.

The soils in this map unit are suited to cultivated crops, pasture, and hay. The slope and the potential for erosion are the main management concerns.

These soils are suitable for trees. Timber production is high. The slope is the main limitation affecting the use of logging equipment, especially during wet periods.

These soils are suitable for residential uses. The main limitation is the slope.

Upland Soils Formed in Residuum Derived from Mixed Basic and Acidic Rocks

6. Cecil-Pacolet-Enott

Gently sloping to steep, very deep and deep, well drained soils that have a clayey and loamy subsoil and are moderately permeable or slowly permeable

This map unit is mainly in the southeastern part the survey area. It is on gently sloping to strongly sloping summits, toe slopes, shoulders, and side slopes and on the moderately steep and steep side slopes of ridges. The soils formed primarily in material weathered from interlayered light colored (acid) and dark (basic) crystalline rocks.

This unit makes up about 3 percent of the survey

Figure 2.—A rolling to steep, highly dissected area of the Madison-Cecil general soil map unit.

area. It is about 30 percent Cecil soils, 30 percent Pacolet soils, 15 percent Enott soils, and 25 percent soils of minor extent.

The Cecil soils are on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges. They are very deep and are moderately permeable. Typically, they have a surface layer of yellowish red sandy clay loam and a subsoil of red clay and clay loam.

The Pacolet soils are on the moderately steep and steep side slopes of ridges. They are very deep and are moderately permeable. Typically, they have a surface layer of dark brown fine sandy loam and a subsoil of red clay and clay loam.

The Enott soils are on the gently sloping to moderately steep, narrow summits, toe slopes, shoulders, and side slopes of ridges, in areas underlain by dark basic crystalline bedrock. They are deep and are slowly permeable. Typically, they have a surface layer of dark grayish brown gravelly fine sandy loam and a subsoil of firm, very plastic, yellowish brown clay and sandy clay loam.

The soils of minor extent are mainly those of the Ashlar, Rion, Appling, and Cullen series. Ashlar soils are in areas where hard bedrock is close to the surface. Rion soils are intermingled with areas of the Pacolet soils on side slopes. Appling soils are on the summits of ridges. Cullen soils are underlain by mixed basic and acidic bedrock.

About 40 percent of this map unit has been cleared. Nearly all of the cleared areas are used for cultivated crops, such as tobacco, corn, and soybeans. Most wooded areas occur as moderately steep and steep soils adjacent to drainageways or as the less productive soils.

Most of the soils in this unit are suited to cultivated crops, pasture, and hay. The main management concerns are the slope, the potential for erosion, and, in some areas, slow permeability in the subsoil.

These soils are suitable for trees. Timber production is high. The slope is the main limitation affecting the use of logging equipment, especially during wet periods.

These soils are suitable for residential uses. The slope is the main limitation. The depth to bedrock in the Enott soils is an additional limitation.

7. Enott-Wilkes-Cullen

Gently sloping to steep, very deep, deep, and shallow, well drained soils that have a clayey or loamy subsoil and are moderately permeable to slowly permeable

This map unit is in the southeastern part the survey area. It is on gently sloping and strongly sloping summits, toe slopes, shoulders, and side slopes and on the moderately steep and steep side slopes of ridges. The soils formed primarily in material weathered from light and dark crystalline rock characterized by naturally low acidity.

This unit makes up about 2 percent of the survey area. It is about 30 percent Enott soils, 20 percent Wilkes soils, 15 percent Cullen soils, and 35 percent soils of minor extent.

The Enott soils are on the gently sloping and strongly sloping summits, toe slopes, shoulders, and side slopes of ridges. They are deep and are slowly permeable. Typically, they have a surface layer of dark grayish brown gravelly fine sandy loam and a subsoil of firm, very plastic, yellowish brown clay and sandy clay loam.

The Wilkes soils generally are on the moderately steep and steep nose slopes and side slopes of ridges. They are shallow and are moderately slowly permeable. Typically, they have a surface layer of dark grayish brown gravelly fine sandy loam and a subsoil of strong brown clay loam.

The Cullen soils are on gently sloping to strongly sloping, broad summits, shoulders, and side slopes. They are very deep and are moderately permeable. Typically, they have a surface layer of yellowish red clay loam and a subsoil of red clay, silty clay, and silty clay loam. They are underlain by mixed bedrock.

The soils of minor extent are mainly those of the Appling, Orange, and Poindexter series. The well drained Appling soils are on the summits of ridges. The moderately well drained Orange soils are in depressions and on flats in the uplands. The moderately deep Poindexter soils are on strongly sloping to steep side slopes.

About 30 percent of this map unit has been cleared. Most of the cleared areas are used as pasture for beef cattle, and a small acreage is used for cultivated crops, such as corn, soybeans, and tobacco. The rest of the unit is woodland, much of which was formerly open.

Most of the soils in this map unit are suited to cultivated crops, pasture, and hay. Only a few areas of the suitable soils are large enough, however, for the efficient use of farm machinery. Also, in many areas the soils are less than 40 inches deep over bedrock and are highly erodible. The soils in these areas are better suited to pasture and hay. Pasture grasses grow well because of the naturally low acidity. The slope and the potential for erosion are the main management concerns.

The soils in this unit are suited to trees. Timber production is high. The slope is the main limitation affecting the use of logging equipment, especially during wet periods.

The Enott and Cullen soils are suitable for residential uses. The slope of both soils and the depth to bedrock in the Enott soils are the main limitations. The Wilkes soils are not suited to residential uses, mainly because of the slope and the depth to bedrock.

8. Cecil-Madison-Cullen

Gently sloping to steep, very deep, well drained soils that have a clayey and loamy subsoil and are moderately permeable

This map unit is in the north-central and southwestern parts the survey area, west of White Oak Mountain. It is on gently sloping to strongly sloping summits, shoulders, and side slopes and on the narrow, moderately steep and steep side slopes of ridges. The soils formed primarily in material weathered from mica gneiss and mica schist mixed with dark igneous rocks.

This unit makes up about 37 percent of the survey area. It is about 60 percent Cecil soils, 25 percent Madison soils, 10 percent Cullen soils, and 5 percent soils of minor extent.

The Cecil soils are on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges. Typically, they have a surface layer of yellowish red sandy clay loam and a subsoil of red clay and clay loam.

The Madison soils are on the moderately steep and steep side slopes of ridges. Typically, they have a surface layer of brown fine sandy loam and a subsoil of red clay and clay loam.

The Cullen soils are on the gently sloping to strongly sloping summits, shoulders, and side slopes of ridges. Typically, they have a surface layer of yellowish red clay loam and a subsoil of red clay, silty clay, and silty clay loam.

The soils of minor extent are mainly those of the Ashlar, Enott, Helena, Poindexter, and Wilkes series. Ashlar, Enott, Poindexter, and Wilkes soils are in areas where bedrock is closer to the surface. Helena soils are in areas that have a seasonal high water table.

About 40 percent of this map unit has been cleared. Most of the cleared areas are used for cultivated crops, such as corn, soybeans, and tobacco. Pasture for beef cattle also is a major use. Wooded areas occur mainly as moderately steep and steep soils adjacent to drainageways.

The soils in this map unit are suited to cultivated

crops, pasture, and hay. The slope and the potential for erosion are the main management concerns.

These soils are suitable for trees. Timber production is high. The slope is the main limitation affecting the use of logging equipment, especially during wet periods.

These soils are suitable for residential uses. The slope is the main limitation.

Upland Soils Formed in Residuum Derived from Coarse Grained and Fine Grained Sedimentary Rocks of Triassic Age

9. Mayodan-Creedmoor

Gently sloping to steep, very deep, well drained and moderately well drained soils that have a clayey subsoil and are moderately permeable or very slowly permeable

This map unit occurs as a band extending through the survey area from northeast to southwest. It is on gently sloping to strongly sloping summits, shoulders, and side slopes and on the moderately steep and steep side slopes of ridges. The soils formed primarily in material weathered from coarse textured sedimentary bedrock.

This unit makes up about 12 percent of the survey area. It is about 75 percent Mayodan soils, 15 percent Creedmoor soils, and 10 percent soils of minor extent.

The Mayodan soils are on the gently sloping to steep summits, shoulders, and side slopes of ridges. They are moderately permeable. Typically, they have a surface layer of yellowish brown fine sandy loam and a subsoil of yellowish red clay and clay loam.

The Creedmoor soils are on the gently sloping and strongly sloping summits, foot slopes, shoulders, and side slopes of ridges. They are very slowly permeable. Typically, they have a surface layer of light yellowish brown fine sandy loam and a subsoil of brownish yellow, plastic sandy clay and clay. The lower part of the subsoil has gray mottles.

The soils of minor extent are mainly those of the Pinkston and Sheva series. Pinkston soils are on the side slopes of White Oak Mountain and on the steep side slopes of ridges around the major drainageways. Sheva soils are in low areas where bedrock is close to the surface.

About 50 percent of this map unit has been cleared. Nearly all of the cleared areas are used for cultivated crops, such as tobacco, corn, and soybeans. Wooded areas occur mainly as moderately steep and steep, stony soils along drainageways and on mountainsides and hillsides.

The soils in this map unit are suited to cultivated crops, pasture, and hay. The main limitations are a temporary high water table and slow permeability in the Creedmoor soils and the slope and potential for erosion in areas of the Mayodan soils.

These soils are suitable for trees. Timber production is high. The slope is the main limitation affecting the use of logging equipment, especially during wet periods.

These soils are suitable for residential uses. The Mayodan soils are limited by the slope. The Creedmoor soils are limited by a seasonal high water table, the very slow permeability, and the slope.

10. Meadows-Stoneville

Gently sloping to strongly sloping, shallow and deep, well drained and somewhat excessively drained soils that have a gravelly, loamy subsoil or a clayey subsoil and are moderately permeable or moderately rapidly permeable

This map unit is in the northeastern and southwestern parts of the survey area, mainly along the west side of the Banister River. It is on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges in the lower areas on uplands. The soils formed primarily in material weathered from red and yellow shale of Triassic age.

This unit makes up about 3 percent of the survey area. It is about 40 percent Meadows soils, 30 percent Stoneville soils, and 30 percent soils of minor extent.

The Meadows soils are on the gently sloping and strongly sloping summits, nose slopes, and side slopes of ridges. They are shallow and are moderately rapidly permeable. Typically, they have a surface layer and subsoil of dark reddish brown gravelly loam.

The Stoneville soils are on the gently sloping and strongly sloping summits, shoulders, and side slopes of ridges. They are deep and are moderately permeable. Typically, they have a surface layer of dark reddish brown silt loam and a subsoil of dark reddish brown, friable, plastic clay.

The soils of minor extent are mainly those of the Sheva and Leaksville series. Sheva soils are well drained and are in low, convex areas along natural drainageways. Leaksville soils are poorly drained and are in some of the low areas along drainageways and around the head of the drainageways.

About 75 percent of this map unit has been cleared. Most of the cleared areas are used for pasture or hay.

The soils in this map unit are suited to cultivated crops, pasture, and hay. In many areas the soils are droughty during the summer because of the shallowness to bedrock and a low available water capacity.

These soils are suitable for trees. Timber production is high. The high water table during wet periods is the main limitation affecting the use of logging equipment.

Mainly because of the slope, the depth to bedrock, and droughtiness, the Meadows soils are not suitable for residential uses. The Stoneville soils are suitable for these uses, but the slope is a limitation.

Soils Formed in Recent Alluvial Deposits on the Flood Plains Along the Major Streams and Rivers

11. Chenneby-Toccoa

Nearly level, very deep, somewhat poorly drained and well drained soils that have a loamy subsoil or substratum and are moderately permeable or moderately rapidly permeable

This map unit is on the flood plains along the larger creeks and rivers. The largest areas are along the Dan and Banister Rivers. The soils formed in recently deposited river sediments.

This unit makes up about 1 percent of the survey area. It is about 50 percent Chenneby soils, 40 percent Toccoa soils, and 10 percent soils of minor extent.

The Chenneby soils are on broad, flat flood plains and in depressions along the edge of the flood plains. They are moderately permeable. Typically, they have a surface layer of dark yellowish brown loam and a subsoil of brownish, mottled loam and silty clay loam.

The Toccoa soils are on narrow flood plains and in slightly convex areas next to the main stream channels. They are moderately rapidly permeable. Typically, they have a surface layer of dark yellowish brown fine sandy loam and a substratum of dark brown fine sandy loam and loam.

The soils of minor extent are mainly those of the Riverview and Wehadkee series. The well drained Riverview soils are on some of the wide flood plains. The poorly drained Wehadkee soils generally are in low areas along the edge of the flood plains, but they make up the entire flood plain in some low areas.

About 75 percent of this map unit has been cleared. Most of the cleared areas are used for cultivated crops, such as corn, soybeans, and small grain.

Most of the soils in this map unit are suited to cultivated crops, pasture, and hay. Flooding is the main hazard, particularly in late winter and early spring. The seasonal high water table is a limitation in some areas.

These soils are suitable for trees. Timber production is very high. The high water table in some areas is the main limitation affecting the use of logging equipment.

These soils are not suitable for residential uses because of the hazard of flooding.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Cecil sandy loam, 2 to 7 percent slopes, is a phase of the Cecil series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Cecil-Urban land complex, 2 to 7 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

Soil Descriptions

1B—Appling sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the convex summits of ridges that commonly are long and winding. Areas range from about 6 to 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, brown sandy loam

Subsoil:
7 to 11 inches, yellowish brown sandy clay loam that has light yellowish brown mottles
11 to 26 inches, strong brown clay that has red mottles
26 to 34 inches, yellowish brown sandy clay that has red bands
34 to 45 inches, yellowish red sandy clay loam that has red mottles
45 to 65 inches, yellowish red, strong brown, and yellowish brown sandy clay loam

Similar inclusions in this unit are Mattaponi soils and soils that have a surface layer of gravelly sandy loam or are severely eroded and have a surface layer of sandy clay loam.

Included with this soil in mapping are intermingled areas of the excessively drained Ashlar soils, the moderately well drained Helena soils, and the well drained Rion soils. Ashlar soils are on nose slopes, along the edge of ridges above steep side slopes, and on narrow ridges. Helena soils are in small upland depressions, around the head of drainageways, and along drainageways at the bottom of side slopes. Rion soils are in scattered areas throughout the unit. They have less clay in the subsoil than the Appling soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are used for cultivated crops. Some areas are used as woodland, pasture, or hayland.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops, especially flue-cured tobacco. The surface layer is very friable and can be easily tilled when moist. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 115 cubic feet per acre. Seeds and seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine is suitable for planting.

The moderate permeability and low strength are the main limitations affecting community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by enlarging the absorption field. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIe.

1C—Appling sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the shoulders and side slopes of ridges along drainageways and streams. Areas are long and winding and range from about 6 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, brown sandy loam

Subsoil:
7 to 11 inches, yellowish brown sandy clay loam that has light yellowish brown mottles

11 to 26 inches, strong brown clay that has red mottles
26 to 34 inches, yellowish brown sandy clay that has red bands
34 to 45 inches, yellowish red sandy clay loam that has red mottles
45 to 65 inches, yellowish red, strong brown, and yellowish brown sandy clay loam

Similar inclusions in this unit are Mattaponi soils and soils that have a surface layer of gravelly sandy loam or are severely eroded and have a surface layer of sandy clay loam.

Included with this soil in mapping are intermingled areas of the excessively drained Ashlar soils, the moderately well drained Helena soils, and the well drained Mattaponi and Rion soils. Ashlar soils are on nose slopes, along the crest of narrow ridges, and on the upper part of side slopes. Helena soils are on some side slopes, generally towards the base of the slopes. Rion soils are in scattered areas throughout the unit. They have less clay than the Appling soil. Also included are small areas of poorly drained soils around the head of drainageways and at the bottom of slopes and small areas of exposed bedrock. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

About half of the acreage is used as woodland. The rest is used for cultivated crops, pasture, or hay.

This soil is moderately well suited to cultivated crops. It is suited to flue-cured tobacco. The surface layer is very friable and can be easily tilled when moist. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface rapidly, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 115 cubic feet per acre. Seeds and seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine is suitable for planting.

The slope, the moderate permeability, and low strength are the main limitations affecting community development. The moderate permeability and the slope are limitations on sites for septic tank absorption fields. These limitations can be overcome by enlarging the absorption field and installing it on the contour. The slope is a limitation on sites for dwellings. Cutting and filling are required to establish a level foundation. The slope and low strength are limitations on sites for local roads and streets. Establishing a level roadbed by cutting and filling and providing suitable base material help to overcome these limitations.

The capability subclass is IIIe.

2C—Ashlar fine sandy loam, 7 to 15 percent slopes. This soil is moderately deep, strongly sloping, and excessively drained. It is on the nose slopes and side slopes of ridges bordering small drainageways. Areas generally are long and narrow and range from about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, yellowish brown fine sandy loam

Subsoil:
2 to 16 inches, yellowish brown fine sandy loam

Substratum:
16 to 22 inches, yellowish brown fine sandy loam

Bedrock:
22 to 30 inches, weathered, multicolored bedrock that crushes to fine sandy loam
30 inches, hard, fine grained crystalline bedrock

Similar inclusions in this unit are soils that are 10 to 20 inches deep over hard bedrock, have stones on the surface, or have a slope of less than 7 percent.

Included with this soil in mapping are small areas of the well drained, moderately permeable Appling, Cecil, Pacolet, and Rion soils. These soils are in scattered areas throughout the unit. They are deeper over bedrock than the Ashlar soil. Dissimilar inclusions make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 20 to 40 inches
Water table: At a depth of more than 72 inches
Root zone: Restricted by the bedrock at a depth of 20 to 40 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used for pasture or hay or for cultivated crops.

This soil is poorly suited to cultivated crops. The surface layer is very friable and can be easily tilled throughout a wide range of moisture conditions. The soil is droughty during the growing season, however, and the response of crops to applications of lime and fertilizer generally is limited by the low amount of available water. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is not well suited to water-management structures. The bedrock interferes with the construction of some terraces and diversions. Because of droughtiness and the rapid rate of runoff, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to ponds. The moderately rapid permeability can result in seepage in the reservoir area and piping in the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is moderately well suited to pasture and hay. Because of droughtiness, establishing or maintaining high-quality forage is difficult. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 120 cubic feet per acre. The trees suitable for planting include loblolly pine, shortleaf pine, and eastern white pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The depth to bedrock limits the rooting depth and thus can result in windthrow.

The slope, the depth to bedrock, and droughtiness are the main limitations affecting community development. The depth to bedrock is a limitation on sites for septic tank absorption fields and excavations. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building

site excavation or road construction, but they add to construction costs. Droughtiness adversely affects lawns and landscaping.

The capability subclass is IIIe.

2D—Ashlar fine sandy loam, 15 to 35 percent slopes. This soil is moderately deep, moderately steep and steep, and excessively drained. It is on the nose slopes and side slopes of ridges bordering small drainageways. Areas generally are long and narrow and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, yellowish brown fine sandy loam

Subsoil:
2 to 16 inches, yellowish brown fine sandy loam

Substratum:
16 to 22 inches, yellowish brown fine sandy loam

Bedrock:
22 to 30 inches, weathered, multicolored bedrock that crushes to fine sandy loam
30 inches, hard, fine grained crystalline bedrock

Similar inclusions in this unit are soils that are 10 to 20 inches deep over hard bedrock or have stones on the surface.

Included with this soil in mapping are small areas of the well drained Pacolet and Rion soils. These soils are in scattered areas throughout the unit. They are deeper over bedrock than the Ashlar soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: 20 to 40 inches
Water table: At a depth of more than 72 inches
Root zone: Restricted by the bedrock at a depth of 20 to 40 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used for pasture or hay.

The slope hinders the safe operation of farm equipment. Because of the slope, this soil is generally unsuited to cultivated crops. It is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil generally is not well suited to water-management structures. The bedrock interferes with the construction of some terraces and diversions, and the slope hinders the safe operation of construction equipment. Because of droughtiness and the very rapid rate of runoff, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to ponds. The moderately rapid permeability can result in seepage in the reservoir area and piping in the dam. Because of the slope, the pond reservoir area is small in relation to the height of the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is moderately well suited to pasture and hay. Because of droughtiness, establishing or maintaining high-quality forage is difficult. The slope hinders the safe operation of farm equipment. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 120 cubic feet per acre. The trees suitable for planting include loblolly pine, shortleaf pine, and eastern white pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The slope limits the use of equipment and results in a hazard of erosion, particularly in areas that are disturbed during harvesting activities.

The slope, the depth to bedrock, and droughtiness are the main limitations affecting community development. The depth to bedrock and the slope are limitations on sites for septic tank absorption fields and excavations and for most types of buildings. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to

construction costs. Droughtiness adversely affects lawns and landscaping.

The capability subclass is VIe.

2E—Ashlar fine sandy loam, 35 to 50 percent slopes. This soil is moderately deep, steep, and excessively drained. It is on the nose slopes and side slopes of ridges bordering small drainageways. Areas generally are long and narrow and range from about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, yellowish brown fine sandy loam

Subsoil:
2 to 16 inches, yellowish brown fine sandy loam

Substratum:
16 to 22 inches, yellowish brown fine sandy loam

Bedrock:
22 to 30 inches, weathered, multicolored bedrock that crushes to fine sandy loam
30 inches, hard, fine grained crystalline bedrock

Similar inclusions in this unit are soils that are 10 to 20 inches deep over hard bedrock or have stones on the surface.

Included with this soil in mapping are small areas of the well drained Pacolet and Rion soils. These soils are in scattered areas throughout the unit. They are deeper over bedrock than the Ashlar soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: 20 to 40 inches
Water table: At a depth of more than 72 inches
Root zone: Restricted by the bedrock at a depth of 20 to 40 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used as unimproved pasture.

The slope hinders the safe operation of farm equipment. Because of the slope, this soil is generally unsuited to cultivated crops. It is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil generally is not well suited to water-management structures. The bedrock interferes with the construction of some terraces and diversions, and the slope hinders the safe operation of construction equipment. Because of droughtiness and the very rapid rate of runoff, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to ponds. The moderately rapid permeability can result in seepage in the reservoir area and piping in the dam. Because of the slope, the pond reservoir area is small in relation to the height of the dam. A soil that is less steep and is deeper over bedrock would be a better site for ponds.

This soil is poorly suited to pasture and hay. Because of droughtiness, establishing or maintaining high-quality forage is difficult. The slope hinders the safe operation of farm equipment.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 120 cubic feet per acre. The trees suitable for planting include loblolly pine, shortleaf pine, and eastern white pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The slope limits the use of equipment and results in a hazard of erosion, particularly in areas that are disturbed during harvesting activities.

The slope, the depth to bedrock, and droughtiness are the main limitations affecting community development. The depth to bedrock and the slope are limitations on sites for septic tank absorption fields and excavations and for most types of buildings. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs. Droughtiness adversely affects lawns and landscaping.

The capability subclass is VIIe.

3A—Bolling fine sandy loam, 0 to 2 percent slopes, rarely flooded. This soil is very deep, nearly level, and moderately well drained. It is on low, smooth

terraces along the major creeks and rivers. Areas are irregular in shape and range from about 3 to 50 acres in size.

The typical sequence depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, brown fine sandy loam

Subsurface layer:
5 to 9 inches, light yellowish brown fine sandy loam that has brown mottles

Subsoil:
9 to 15 inches, light yellowish brown clay loam that has yellowish brown and strong brown mottles
15 to 32 inches, yellowish brown clay loam that has light gray and yellowish brown mottles
32 to 53 inches, variegated light gray, pale brown, and yellowish brown clay loam

Substratum:
53 to 65 inches, light brown sandy clay loam that has yellowish brown and light gray mottles

Similar inclusions in this unit are soils that have a clayey subsoil.

Included with this soil in mapping are small areas of the well drained State soils and the somewhat poorly drained Chenneby soils. State soils are in gently sloping areas at the slightly higher elevations. Chenneby soils are in small, slightly concave depressions. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Content of organic matter: Low
Natural fertility: Medium
Soil reaction: Generally very strongly acid to neutral throughout the profile, but moderately alkaline in lower part of the subsoil in some areas
Surface runoff: Slow
Erosion potential: Low
Depth to bedrock: More than 60 inches
Water table: Apparent at a depth of 1.5 to 2.5 feet from December through March
Root zone: More than 60 inches
Shrink-swell potential: Moderate
Flooding: Rare

Most areas are used as woodland. The rest are used as cropland or pasture.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops. The most common crops are soybeans, small grain, and corn. The surface layer is very friable and can be easily tilled, but wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. The soil is not highly erodible, but conservation measures are needed in some areas to control low levels of erosion and maintain productivity. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, minimize crusting, and increase the rate of water infiltration.

Terraces, diversions, and grassed waterways generally are not needed on this nearly level soil. Grassed waterways are established in some areas, however, to divert surface water to an outlet.

The wetness is a limitation on sites for animal waste lagoons, but compacting the floor of the lagoon can help to overcome this limitation. The supply of water is usually insufficient to keep a pond full in most areas. The soil is a poor source of embankment material because of the wetness. Irrigation usually is not needed because of the natural wetness. Tile drainage usually works well. Diversion ditches help to channel excess surface water away from cultivated fields.

This soil is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 130 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Loblolly pine, yellow-poplar, shortleaf pine, and Virginia pine are the most common tree species. The soil is soft when wet. As a result, the use of heavy timber equipment is limited during wet periods.

Flooding, wetness, the moderate permeability, and low strength are the main limitations affecting community development. The wetness and the moderate permeability are limitations on sites for septic tank absorption fields. A different method of sewage disposal or a better suited soil should be considered. The flooding and the wetness are limitations on sites for dwellings with basements. Installing drainage pipe under and around the foundation and backfilling with gravel to the surface can help to overcome the wetness if a suitable drainage outlet is available. Low strength is

a limitation on sites for local roads and streets. It generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIw.

3B—Bolling fine sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on low, smooth terraces along the major creeks and rivers. Areas are irregular in shape and range from about 3 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, brown fine sandy loam

Subsurface layer:
5 to 9 inches, light yellowish brown fine sandy loam that has brown mottles

Subsoil:
9 to 15 inches, light yellowish brown clay loam that has yellowish brown and strong brown mottles
15 to 32 inches, yellowish brown clay loam that has light gray and yellowish brown mottles
32 to 53 inches, variegated light gray, pale brown, and yellowish brown clay loam

Substratum:
53 to 65 inches, light brown sandy clay loam that has yellowish brown and light gray mottles

Similar inclusions in this unit are soils that have a clayey subsoil.

Included with this soil in mapping are small areas of the well drained State soils. These soils are in gently sloping areas at the slightly higher elevations. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Content of organic matter: Low
Natural fertility: Medium
Soil reaction: Very strongly acid to neutral in the surface layer, the subsurface layer, and the upper part of the subsoil and moderately acid to moderately alkaline in the lower part of the subsoil and in the substratum
Surface runoff: Medium
Erosion potential: Medium
Water table: Apparent at a depth of 1.5 to 2.5 feet from December through March
Root zone: More than 60 inches
Shrink-swell potential: Moderate
Flooding: None

Most areas are used as woodland. The rest are used as cropland or pasture.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops. The most common crops are soybeans, small grain, and corn. The surface layer is very friable and can be easily tilled, but wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, establishing grassed waterways, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth and control erosion.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability in the lower part of the subsoil is a limitation on sites for animal waste lagoons, but compacting the floor of the lagoon can help to overcome this limitation. The supply of water is insufficient to keep a pond full in most areas. The soil is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. Irrigation usually is not needed because of the natural wetness. Tile drainage generally is not effective because of the moderate permeability in the upper part of the subsoil. Diversion ditches help to channel excess surface water away from cultivated fields.

This soil is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood

is 130 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Loblolly pine, yellow-poplar, shortleaf pine, and Virginia pine are the most common tree species. The soil is soft when wet. As a result, the use of heavy timber equipment is limited during wet periods.

Wetness, the moderate permeability, and low strength are the main limitations affecting community development. The wetness and the moderate permeability are limitations on sites for septic tank absorption fields. A different method of sewage disposal or a better suited soil should be considered. The wetness is a limitation on sites for dwellings with basements. Installing drainage pipe under and around the foundation and backfilling with gravel to the surface can help to overcome this limitation if a suitable drainage outlet is available. Low strength is a limitation on sites for local roads and streets. It generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIe.

4B—Cecil sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is the on the narrow or broad summits of ridges. Areas are irregular in shape and range from about 6 to 150 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, yellowish red sandy loam

Subsoil:
8 to 19 inches, red clay that has yellowish brown mottles
19 to 34 inches, red clay
34 to 59 inches, red clay loam

Substratum:
59 to 65 inches, red and reddish yellow saprolite that has a texture of loam

Similar inclusions in this unit are Madison soils and soils that are severely eroded and have a surface layer of clay loam or have a gravelly surface layer.

Included with this soil in mapping are intermingled areas of the moderately well drained Helena soils and the well drained Enott soils. Helena soils are in small upland depressions, around the head of drainageways, and along drainageways at the bottom of side slopes. Enott soils are on narrow ridgetops and nose slopes. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are used for cultivated crops. Some areas are used as woodland, pasture, or hayland.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops, including flue-cured tobacco. The surface layer is friable and can be easily tilled when moist. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures

Figure 3.—Loblolly pine in an area of Cecil sandy loam, 2 to 7 percent slopes.

that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high (fig. 3). The estimated annual production of wood is 115 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine is suitable for planting.

The moderate permeability and low strength are the main limitations affecting community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by enlarging the absorption field. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIe.

4C—Cecil sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is

on the shoulders and side slopes of ridges along drainageways and streams. Areas commonly are long and winding. They range from about 6 to 150 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, yellowish red sandy loam

Subsoil:
8 to 19 inches, red clay that has yellowish brown mottles
19 to 34 inches, red clay
34 to 59 inches, red clay loam

Substratum:
59 to 65 inches, red and reddish yellow saprolite that has a texture of loam

Similar inclusions in this unit are Madison soils and soils that are severely eroded and have a surface layer of clay loam or have a gravelly surface layer.

Included with this soil in mapping are intermingled areas of the moderately well drained Helena soils and the well drained Enott soils. Helena soils are in small upland depressions, around the head of drainageways, and along drainageways at the base of side slopes. Enott soils are on narrow ridgetops and nose slopes. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are farmed. The rest are used as woodland.

This soil is moderately well suited to cultivated crops. The surface layer is friable and can be easily tilled when moist. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling is necessary to establish a level lagoon floor. The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface rapidly, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 115 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation such as prescribed burning. Loblolly pine is suitable for planting.

The slope, the moderate permeability, and low strength are the main limitations affecting community development. The moderate permeability and the slope are limitations on sites for septic tank absorption fields. These limitations can be overcome by enlarging the absorption field and installing it on the contour. The slope is a limitation on sites for dwellings. Cutting and filling are required to establish a level foundation. The slope and low strength are limitations on sites for local roads and streets. Establishing a level roadbed by

cutting and filling and providing suitable base material help to overcome these limitations.

The capability subclass is IIIe.

5B3—Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded. This soil is very deep, gently sloping and well drained. It is on the narrow or broad summits of ridges. Areas generally are long and winding and range from about 6 to 150 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, yellowish red sandy clay loam

Subsoil:
8 to 19 inches, red clay that has yellowish brown mottles
19 to 34 inches, red clay
34 to 59 inches, red clay loam

Substratum:
59 to 65 inches, red and reddish yellow saprolite that has a texture of loam

Similar inclusions in this unit are Madison soils and soils that have a surface layer of sandy loam or have stones on the surface.

Included with this soil in mapping are intermingled areas of the moderately well drained Helena soils and the well drained Enott soils. Helena soils are in small upland depressions, around the head of drainageways, and along drainageways at the base of side slopes. Enott soils are on narrow ridgetops and nose slopes. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Moderate
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are used for cultivated crops. Some areas are used as woodland, pasture, or hayland.

This soil is moderately well suited to cultivated crops. The surface layer is friable and can be easily tilled when moist, but it becomes cloddy if tilled when too wet or too dry. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, and including grasses and legumes in the cropping system help to control erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 115 cubic feet per acre. The survival and growth of seedlings are limited on this severely eroded soil. Proper site preparation, such as drum chopping and prescribed burning, helps to establish seedlings and increases productivity. Loblolly pine is suitable for planting.

The moderate permeability and low strength are the main limitations affecting community development. The

moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by enlarging the absorption field. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIIe.

5C3—Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded. This soil is very deep, strongly sloping, and well drained. It is on the narrow shoulders and side slopes of ridges along drainageways and small streams. Areas are long and winding and range from about 6 to 150 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, yellowish red sandy clay loam

Subsoil:
8 to 19 inches, red clay that has yellowish brown mottles
19 to 34 inches, red clay
34 to 59 inches, red clay loam

Substratum:
59 to 65 inches, red and reddish yellow saprolite that has a texture of loam

Similar inclusions in this unit are Madison soils and soils that have a surface layer of sandy loam or have stones on the surface.

Included with this soil in mapping are intermingled areas of the moderately well drained Helena soils and the well drained Enott soils. Helena soils are in small upland depressions, around the head of drainageways, and along drainageways at the base of side slopes. Enott soils are on narrow ridgetops and nose slopes. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

About half of the acreage is used as woodland. The rest is used mainly for cultivated crops, but a few areas are used as pasture.

This soil is poorly suited to cultivated crops. The surface layer is friable and can be easily tilled when moist, but it becomes cloddy if tilled when too wet or too dry. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, and including grasses and legumes in the cropping system help to control erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface rapidly, increasing the hazards of nutrient loss and erosion.

This soil is moderately well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 115 cubic feet per acre. The survival and growth of seedlings are limited on this severely eroded soil.

Proper site preparation, such as drum chopping and prescribed burning, helps to establish seedlings and increases productivity. Loblolly pine is suitable for planting.

The slope, the moderate permeability, and low strength are the main limitations affecting community development. The moderate permeability and the slope are limitations on sites for septic tank absorption fields, but these limitations can be overcome by enlarging the absorption field and installing it on the contour. The slope is a limitation on sites for dwellings. Cutting and filling are required to establish a level foundation. The slope and low strength are limitations on sites for local roads and streets. Establishing a level roadbed by cutting and filling and providing suitable base material help to overcome these limitations.

The capability subclass is IVe.

6B—Cecil-Urban land complex, 2 to 7 percent slopes. This map unit consists of gently sloping areas of a very deep, well drained Cecil soil and areas that are covered mainly with asphalt, concrete, buildings, and other structures. The unit is on uplands, mainly near and in the city of Danville and the towns of Chatham, Gretna, and Hurt. Areas are irregular in shape and range from about 5 to 50 acres in size.

This map unit is about 35 percent Urban land, 45 percent Cecil soil, and 20 percent other soils. The Cecil soil and Urban land occur as areas so intermingled that mapping them separately is not practical.

The typical sequence, depth, and composition of the layers of the Cecil soil are as follows—

Surface layer:
0 to 8 inches, yellowish red sandy clay loam

Subsoil:
8 to 19 inches, red clay that has yellowish brown mottles
19 to 34 inches, red clay
34 to 59 inches, red clay loam

Substratum:
59 to 65 inches, red and reddish yellow saprolite that has a texture of loam

Similar inclusions in this unit are Appling, Enott, and Madison soils.

Included in this unit in mapping are the excessively drained, moderately deep Ashlar soils and the moderately well drained Helena soils. Ashlar soils are mainly on the end of narrow ridges that have steep side slopes. Helena soils are around the head of drainageways. Also included are soils that have been partially disturbed by construction activities. Dissimilar inclusions make up about 15 percent of the unit.

Important properties of the Cecil soil—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Areas of this unit that are not covered by urban structures include the front and back yards of houses, vacant lots, the courtyards of apartments or other large buildings, small parks, and traffic islands and circles. The size and location of the areas limit most uses other than lawns and gardens.

The Cecil soil and most of the included soils are well suited to lawns, landscaping, and gardens. Onsite investigation is necessary, however, because in many areas the topsoil and part of the subsoil have been removed and such materials as boards, concrete chunks, bricks, and cinder blocks commonly are buried in the fill around the foundations of buildings. These materials commonly limit the rooting depth and the available water capacity of the soil. Adding topsoil increases the available water capacity and the rooting depth for lawns and shrubs.

The Cecil soil and most of the included soils are suited to shade trees. Care is needed to protect the rooting area around trees from compaction or disturbance during construction. Tree roots can be protected by constructing a retaining wall, a dry well, or a fence around the trees. The trees can die if more than about 6 inches of fill material or topsoil is added around them. The trees that adapt well to the environmental changes common on construction sites include elm, poplar, willow, and locust. When sites for tree planting are selected, special care is needed to ensure that adequate topsoil is in place for a good rooting depth.

The moderate permeability and low strength are the main limitations if the Cecil soil is used for community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by enlarging the absorption field. Low strength is a limitation on sites for local roads and streets. This limitation can be overcome by providing suitable base material. Onsite investigation

generally is necessary to determine the suitability of this unit for a specific use.

No capability classification is assigned.

6C—Cecil-Urban land complex, 7 to 20 percent slopes. This map unit consists of strongly sloping and moderately steep areas of a very deep, well drained Cecil soil and areas that are covered mainly with asphalt, concrete, buildings, and other structures. The unit is on uplands, mainly near and in the city of Danville and the towns of Chatham, Gretna, and Hurt. Areas are irregular in shape and range from about 5 to 30 acres in size.

This map unit is about 35 percent Urban land, 50 percent Cecil soil, and 15 percent other soils. The Cecil soil and Urban land occur as areas so intermingled that mapping them separately is not practical.

The typical sequence, depth, and composition of the layers of the Cecil soil are as follows—

Surface layer:
0 to 8 inches, yellowish red sandy clay loam

Subsoil:
8 to 19 inches, red clay that has yellowish brown mottles
19 to 34 inches, red clay
34 to 59 inches, red clay loam

Substratum:
59 to 65 inches, red and reddish yellow saprolite that has a texture of loam

Similar inclusions in this unit are Appling, Enott, and Madison soils.

Included in this unit in mapping are the excessively drained, moderately deep Ashlar soils and the moderately well drained Helena soils. Ashlar soils are mainly on the end of narrow ridges that have steep side slopes. Helena soils are around the head of drainageways. Also included are soils that have been partially disturbed by construction activities. Dissimilar inclusions make up about 15 percent of the unit.

Important properties of the Cecil soil—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Areas of this unit that are not covered by urban structures include the front and back yards of houses, vacant lots, the courtyards of apartments or other large buildings, small parks, and traffic islands and circles. The size and location of the areas limit most uses other than lawns and gardens.

The Cecil soil and most of the included soils are well suited to lawns, landscaping, and gardens. Onsite investigation is necessary, however, because in many areas the topsoil and part of the subsoil have been removed and such materials as boards, concrete chunks, bricks, and cinder blocks commonly are buried in the fill around the foundations of buildings. These materials commonly limit the rooting depth and the available water capacity of the soil. Adding topsoil increases the available water capacity and the rooting depth for lawns and shrubs.

The Cecil soil and most of the included soils are suited to shade trees. Care is needed to protect the rooting area around trees from compaction or disturbance during construction. Tree roots can be protected by constructing a retaining wall, a dry well, or a fence around the trees. The trees can die if more than about 6 inches of fill material or topsoil is added around them. The trees that adapt well to the environmental changes common on construction sites include elm, poplar, willow, and locust. When sites for tree planting are selected, special care is needed to ensure that adequate topsoil is in place for a good rooting depth.

The slope, the moderate permeability, and low strength are the main limitations if the Cecil soil is used for community development. The slope and the moderate permeability are limitations on sites for septic tank absorption fields, but these limitations generally can be overcome by enlarging the absorption field, and installing it on the contour. Low strength and the slope are limitations on sites for local roads and streets, but they can be overcome by providing suitable base material. Cutting and filling are necessary to establish a level roadbed. Onsite investigation generally is necessary to determine the suitability of this unit for a specific use.

No capability classification is assigned.

7A—Chenneby loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, nearly level, and somewhat poorly drained. It is on low flood plains along rivers and large creeks and is occasionally flooded for very brief periods from late fall to spring. Areas commonly are long and narrow. They range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark yellowish brown loam

Subsoil:
6 to 12 inches, dark yellowish brown loam that has reddish brown mottles
12 to 18 inches, yellowish brown silty clay loam that has brown and grayish brown mottles
18 to 23 inches, brown silty clay loam that has brown and light brownish gray mottles
23 to 30 inches, mottled strong brown and light brownish gray silty clay loam
30 to 37 inches, light brownish gray silty clay loam that has strong brown mottles
37 to 65 inches, mottled light brownish gray, yellowish brown, and strong brown clay loam

Included with this soil in mapping are small areas of the well drained Riverview and Toccoa soils and the poorly drained Wehadkee soils. Riverview and Toccoa soils are in the slightly higher areas, mainly on the part of the unit that is closer to the streams. Wehadkee soils are in depressions and areas that are farthest from the streams. Dissimilar inclusions make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Content of organic matter: Medium
Natural fertility: Medium
Soil reaction: Mainly strongly acid to moderately acid, but very strongly acid in some areas
Surface runoff: Slow
Erosion potential: Low
Depth to bedrock: More than 60 inches
Water table: Apparent at a depth of 1.0 to 2.5 feet from January through March
Root zone: 60 inches or more
Shrink-swell potential: Low
Flooding: Occasional, from December through April

Most areas have been drained and are used for cultivated crops. A few areas are used as pasture or woodland.

Drained areas of this soil meet the requirements for prime farmland. They are well suited to cultivated crops. Undrained areas are moderately well suited to cultivated crops. The surface layer is very friable and can be easily tilled, but the soil is wet and cold in the spring and the wetness often delays cultivation. Unless the soil is protected, crops are damaged by flooding on an average of once every 2 to 5 years. The soil is not highly erodible. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, minimize crusting, and increase the rate of water infiltration.

Terraces, diversions, and grassed waterways generally are not needed on this nearly level soil. Grassed waterways are established in some areas, however, to divert surface water to an outlet.

This soil is limited as a site for animal waste lagoons because of the hazard of flooding and the seasonal high water table. A better drained soil that is not subject to flooding should be considered. The soil is suitable as a site for ponds if the reservoir area is sufficient. Seepage is a hazard during dry periods, however, because of the moderate permeability. The soil is a poor source of material for embankments. It cannot be easily compacted, and piping is a hazard. Irrigation usually is not needed because of the natural wetness and the flooding. The soil generally can be drained, although floodwater sometimes temporarily rises above the drainage outlet.

This soil is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, a drainage system, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 155 cubic feet per acre for loblolly pine. Seasonal wetness causes a high rate of seedling mortality. The soil is soft when wet, mainly from late fall to spring. As a result, the use of heavy timber equipment is limited during wet periods.

The flooding, wetness, and low strength are the major limitations affecting community development. The flooding and the wetness are limitations on sites for dwellings and for most sanitary facilities. Many areas dry out slowly in the spring and after heavy rains. Dikes and levees help to protect limited areas of the soil from flooding, and open-ditch or subsurface drainage systems help to overcome the wetness. The construction and maintenance of these water-control structures, however, impose additional costs. As a result, buildings should be constructed on a soil that is not limited by flooding or wetness. Low strength is a limitation on sites for local roads and streets. It

generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIw.

8A—Chenneby-Toccoa complex, 0 to 2 percent slopes, frequently flooded. These very deep, nearly level, somewhat poorly drained and well drained soils are on narrow flood plains along small rivers and large creeks. They are frequently flooded for very brief periods from winter to early spring. The Toccoa soil generally is in convex areas close to the streams. The Chenneby soil generally is in concave areas farther away from the streams and in areas where the smaller tributaries cross the flood plains. Areas generally are long and winding and range from 15 to 200 acres in size.

This map unit about 45 percent Chenneby soil, 30 percent Toccoa soil, and 25 percent other soils. The Chenneby and Toccoa soils occur as areas so intermingled that mapping them separately is not practical.

The typical sequence, depth, and composition of the layers of the Chenneby soil are as follows—

Surface layer:
- 0 to 6 inches, dark yellowish brown loam

Subsoil:
- 6 to 12 inches, dark yellowish brown loam that has reddish brown mottles
- 12 to 18 inches, yellowish brown silty clay loam that has brown and grayish brown mottles
- 18 to 23 inches, brown silty clay loam that has brown and light brownish gray mottles
- 23 to 30 inches, mottled strong brown and light brownish gray silty clay loam
- 30 to 37 inches, light brownish gray silty clay loam that has strong brown mottles
- 37 to 65 inches, mottled light brownish gray, yellowish brown, and strong brown clay loam

The typical sequence, depth, and composition of the layers of the Toccoa soil are as follows—

Surface layer:
- 0 to 8 inches, dark yellowish brown fine sandy loam

Substratum:
- 8 to 24 inches, dark yellowish brown fine sandy loam
- 24 to 31 inches, dark brown fine sandy loam
- 31 to 36 inches, very dark grayish brown loam
- 36 to 45 inches, dark brown loam
- 45 to 65 inches, dark brown fine sandy loam

Similar inclusions in this unit are Riverview soils. Included with these soils in mapping are small areas of the well drained State soils and the poorly drained Wehadkee soils. State soils are on the higher stream terraces. Wehadkee soils are in depressions and areas that are farthest from the streams. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Chenneby—moderate; Toccoa—moderately rapid
Available water capacity: Chenneby—high; Toccoa—moderate
Content of organic matter: Chenneby—moderate; Toccoa—low
Natural fertility: Chenneby—medium; Toccoa—low
Soil reaction: Chenneby—generally strongly acid or moderately acid throughout the profile, but can be very strongly acid in the subsoil; Toccoa—strongly acid to slightly acid throughout the profile
Surface runoff: Slow
Erosion potential: Low
Depth to bedrock: More than 60 inches
Water table: Chenneby—apparent at a depth of 1.0 to 2.5 feet from January through March; Toccoa—apparent at a depth of 2.5 to 5.0 feet from December through April
Root zone: More than 60 inches
Shrink-swell potential: Low
Flooding: Frequent, from December through April

Most areas are used as woodland. Some of the wider areas are used as pasture or are cultivated.

Undrained areas of these soils are poorly suited to cultivated crops. The surface layer of both soils is very friable and can be easily tilled, but the Chenneby soil is wet and cold in the spring. The wetness often delays planting and cultivation. Unless the soils are protected, crops are damaged by flooding on an average of once every 2 years. The soils are not highly erodible. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soils help to maintain the content of organic matter and tilth, minimize crusting, and increase the rate of water infiltration.

Terraces, diversions, and grassed waterways generally are not needed on these nearly level soils. Grassed waterways are established in some areas, however, to divert surface water to an outlet.

These soils are limited as sites for animal waste lagoons because of the hazard of flooding and the seasonal high water table. A better drained soil that is not subject to flooding should be considered. The soils are suitable as sites for ponds if the reservoir area is sufficient. Seepage is a hazard during dry periods, however, because of the moderately rapid permeability

in the Toccoa soil. The soils are a poor source of material for embankments. They cannot be easily compacted, and piping is a hazard. Irrigation usually is not needed because of the natural wetness and the flooding. The Chenneby soil generally can be drained, although floodwater sometimes temporarily rises above the drainage outlet.

These soils are well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, a drainage system, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing and grazing when the soils are wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of these soils for loblolly pine is very high. The estimated annual production of wood is 155 cubic feet per acre on the Chenneby soil and 130 cubic feet per acre in the Toccoa soil. Seasonal wetness causes a high rate of seedling mortality. The soils are soft when wet, mainly from late fall to spring. As a result, the use of heavy timber equipment is limited during wet periods.

The flooding, wetness, and low strength are the major limitations affecting community development. The flooding and the wetness are limitations on sites for dwellings and for most sanitary facilities. Many areas dry out slowly in the spring and after heavy rains. Buildings should be constructed on a soil that is not limited by flooding or wetness. Low strength is a limitation on sites for local roads and streets. It generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is VIw in areas of the Chenneby soil and IIw in areas of the Toccoa soil.

9B—Creedmoor fine sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the summits and foot slopes of ridges. Areas are irregular in shape and range from about 3 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches, light yellowish brown fine sandy loam

Subsoil:

10 to 24 inches, brownish yellow sandy clay that has yellowish red mottles

24 to 37 inches, brownish yellow sandy clay that has light gray and red mottles

37 to 65 inches, light gray clay loam that has red mottles

Included with this soil in mapping are small areas of the well drained Mayodan soils, the somewhat poorly drained Leaksville soils, and the moderately well drained, moderately deep Sheva soils. Mayodan soils are on gently sloping ridges and side slopes. Leaksville soils are in broad, smooth, slightly concave depressions. Sheva soils are in landscape positions similar to those of the Creedmoor soil. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Very slow
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Extremely acid to strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: Perched at a depth of 1.5 to 2.0 feet from January through March
Root zone: Limited for most crops by a very plastic layer in the subsoil
Shrink-swell potential: Moderate

Most areas are used for cultivated crops. The rest are wooded.

This soil is moderately well suited to cultivated crops. The most common crops are tobacco, small grain, and corn. The surface layer is very friable and can be easily tilled, but wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, establishing grassed waterways, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth and control erosion.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant

cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

This soil generally is suitable as a site for animal waste lagoons. It is a good site for ponds. It is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. Irrigation usually is not needed because of the natural wetness. Tile drainage generally is not effective because of the very slow permeability in the subsoil. Diversion ditches help to channel excess surface water away from cultivated fields.

This soil is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 125 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Loblolly pine, Virginia pine, sweetgum, and willow oak are the most common tree species. The soil is soft when wet. As a result, the use of heavy timber equipment is limited during wet periods.

Wetness, the very slow permeability, the shrink-swell potential, and low strength are the main limitations affecting community development. The wetness and the very slow permeability are limitations on sites for septic tank absorption fields. A different method of sewage disposal or a better suited soil should be considered. The wetness and the shrink-swell potential are limitations on sites for dwellings with basements. Installing drainage tile under and around the foundation and backfilling with gravel to the surface can help to overcome the wetness if a suitable drainage outlet is available. The foundation should be strengthened because of the shrink-swell potential. Low strength is a limitation on sites for local roads and streets. It generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIe.

9C—Creedmoor fine sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on the shoulders, side slopes, and foot slopes of ridges. Areas are irregular in shape and range from about 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, light yellowish brown fine sandy loam

Subsoil:
10 to 24 inches, brownish yellow sandy clay that has yellowish red mottles
24 to 37 inches, brownish yellow sandy clay that has light gray and red mottles
37 to 65 inches, light gray clay that has red mottles

Included with this soil in mapping are small areas of the well drained Mayodan soils and the moderately well drained, moderately deep Sheva soils. Mayodan soils are on the slightly higher, narrow ridges and side slopes. Sheva soils are in landscape positions similar to those of the Creedmoor soil. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Very slow
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Extremely acid to strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: Perched at a depth of 1.5 to 2.0 feet from January through March
Root zone: Limited for most crops by a very plastic layer in the subsoil
Shrink-swell potential: Moderate

Most areas are used for cultivated crops. The rest are wooded.

This soil is moderately well suited to cultivated crops. The most common crops are tobacco and small grain. The surface layer is very friable and can be easily tilled, but wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, establishing grassed waterways, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth and control erosion.

This soil generally is suitable as a site for water-

management structures, including terraces, diversions, and grassed waterways. Erosion is a hazard during construction because of the slope. It can be controlled by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The soil is a good site for ponds. It is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. Irrigation usually is not needed because of the natural wetness. Tile drainage generally is not effective because of the very slow permeability in the subsoil. Diversion ditches help to channel excess surface water away from cultivated fields.

This soil is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and thus increase the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 125 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Loblolly pine, Virginia pine, sweetgum, and willow oak are the most common tree species. The soil is soft when wet. As a result, the use of heavy timber equipment is limited during wet periods.

Wetness, the very slow permeability, the shrink-swell potential, the slope, and low strength are the main limitations affecting community development. The wetness, the very slow permeability, and the slope are limitations on sites for septic tank absorption fields. A different method of sewage disposal or a better suited soil should be considered. The wetness, the shrink-swell potential, and the slope are limitations on sites for dwellings with basements. Installing drainage tile under and around the foundation and backfilling with gravel to the surface can help to overcome the wetness if a suitable drainage outlet is available. The foundation should be strengthened because of the shrink-swell potential. Low strength is a limitation on sites for local roads and streets. It generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIIe.

10B—Cullen loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the narrow or broad summits of ridges. Areas generally are long and narrow and range from about 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, yellowish red loam

Subsoil:
6 to 42 inches, red clay
42 to 62 inches, red silty clay that has dark reddish brown mottles
62 to 75 inches, red silty clay loam that has yellow mottles

Substratum:
75 to 90 inches, yellowish red silt loam that has yellow mottles

Similar inclusions in this unit are soils that have a higher content of mica than the Cullen soil or have a thinner solum.

Included with this soil in mapping are small areas of the well drained, shallow Wilkes soils and the well drained, deep Enott soils. Wilkes and Enott soils are on some of the narrow ridgetops and nose slopes and generally are lower on the landscape than the Cullen soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Strongly acid or moderately acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Moderate

Most areas are used for cultivated crops. Some areas are used for pasture or hay, and some are wooded.

This soil meets the requirements for prime farmland. It is well suited to such cultivated crops as corn, soybeans, and small grain. It is moderately well suited to flue-cured tobacco. The surface layer is friable and can be easily tilled when moist, but it becomes cloddy if tilled when the soil is either too dry or too wet. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter, improve tilth, help to control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is a poor source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the soil is highly erodible and the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. The trees that can be planted for commercial production include loblolly pine and eastern white pine. Prescribed burning, drum chopping, clearing, cutting, and girdling help to control competing vegetation.

Low strength, the moderate permeability, and the moderate shrink-swell potential are the main limitations affecting community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by enlarging the absorption field. The moderate shrink-swell in the subsoil is a limitation on sites for dwellings, but reinforcing the foundation and backfilling with better suited soil material help to overcome this limitation. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIe.

11B3—Cullen clay loam, 2 to 7 percent slopes, severely eroded. This soil is very deep, gently sloping, and well drained. It is on the narrow or broad summits of ridges. Areas generally are long and narrow and range from about 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, yellowish red clay loam

Subsoil:
6 to 42 inches, red clay
42 to 62 inches, red silty clay that has dark reddish brown mottles
62 to 75 inches, red silty clay loam that has yellow mottles

Substratum:
75 to 90 inches, yellowish red silt loam that has yellow mottles

Similar inclusions in this unit are soils that have a higher content of mica than the Cullen soil or have a thinner solum.

Included with this soil in mapping are small areas of the well drained, shallow Wilkes soils and the well drained, deep Enott soils. Wilkes and Enott soils are on some of the narrow ridgetops and nose slopes and generally are lower on the landscape than the Cullen soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low

Soil reaction: Strongly acid or moderately acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Moderate

Most areas are used for cultivated crops. Some areas are used for pasture or hay, and some are wooded.

This soil is well suited to such cultivated crops as corn, soybeans, and small grain. It is moderately well suited to flue-cured tobacco. The surface layer is friable when moist but hard when dry. It becomes cloddy if tilled when the soil is either too dry or too wet. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter, improve tilth, help to control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is a poor source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the soil is highly erodible and the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. The trees that can be planted for commercial production include loblolly pine and eastern white pine. Prescribed burning, drum chopping, clearing, cutting, and girdling help to control competing vegetation.

Low strength, the moderate permeability, and the moderate shrink-swell potential are the main limitations affecting community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by enlarging the absorption field. The moderate shrink-swell in the subsoil is a limitation on sites for dwellings, but reinforcing the foundation and backfilling with better suited soil material help to overcome this limitation. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIIe.

11C3—Cullen clay loam, 7 to 15 percent slopes, severely eroded. This soil is very deep, strongly sloping, and well drained. It is on the shoulders and side slopes of ridges along drainageways. Areas are irregular in shape and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, yellowish red clay loam

Subsoil:
6 to 42 inches, red clay
42 to 62 inches, red silty clay that has dark reddish brown mottles
62 to 75 inches, red silty clay loam that has yellow mottles

Substratum:
75 to 90 inches, yellowish red silt loam that has yellow mottles

Similar inclusions in this unit are soils that have a higher content of mica than the Cullen soil or have a thinner solum.

Included with this soil in mapping are small areas of the well drained, shallow Wilkes soils and the well drained, deep Enott soils. Wilkes and Enott soils are on

some of the narrow ridgetops and nose slopes and in the steeper areas. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Strongly acid or moderately acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Moderate

About half of the areas are used for cultivated crops or pasture. The rest are used as woodland.

This soil is poorly suited to cultivated crops, including flue-cured tobacco. The surface layer is friable when moist but hard when dry. It becomes cloddy if tilled when the soil is either too dry or too wet. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter, improve tilth, help to control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope is a limitation on sites for animal waste lagoons. Considerable cutting and filling are necessary to establish a level lagoon floor. The moderate permeability is a limitation on sites for ponds, but compacting the floor of the pond helps to overcome this limitation. The soil cannot be easily compacted and thus is a poor source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the soil is highly erodible and the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is moderately well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. The trees that can be planted for commercial production include loblolly pine and eastern white pine. Prescribed burning, drum chopping, clearing, cutting, and girdling help to control competing vegetation.

The slope, low strength, the moderate permeability, and the moderate shrink-swell potential are the main limitations affecting community development. The moderate permeability and the slope are limitations on sites for septic tank absorption fields, but these limitations generally can be overcome by enlarging the absorption field and installing it on the contour. The moderate shrink-swell in the subsoil is a limitation on sites for dwellings, but reinforcing the foundation and backfilling with better suited soil material help to overcome this limitation. Because of the slope, considerable cutting and filling are required to establish a level foundation. Low strength and the slope are limitations on sites for local roads and streets. Low strength can be overcome by providing suitable base material. Cutting and filling are required to establish a level roadbed.

The capability subclass is IVe.

12B—Enott fine sandy loam, 2 to 7 percent slopes. This soil is deep over soft bedrock, gently sloping, and well drained. It is on the summits and toe slopes of low ridges. Areas range from about 10 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, brownish yellow fine sandy loam
6 to 10 inches, brownish yellow fine sandy loam that has strong brown mottles

Subsoil:
10 to 18 inches, strong brown clay that has yellowish red, relict mottles
18 to 29 inches, yellowish brown clay
29 to 33 inches, light olive brown sandy clay loam that has greenish gray remnants of weathered saprolite

Substratum:

33 to 42 inches, greenish gray, light yellowish brown, and light olive brown fine sandy loam

Bedrock:

42 to 53 inches, greenish gray, light olive brown, and light yellowish brown, weathered bedrock that crushes to fine sandy loam

Similar inclusions in this unit are soils that have a red subsoil.

Included with this soil in mapping are intermingled areas of the very deep, well drained Appling soils, the deep, moderately well drained Orange soils, and the shallow, well drained Wilkes soils. Appling soils are in the slightly higher areas, Orange soils are in the lower areas near the base of the slopes, and Wilkes soils are mainly at the end of ridges. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Slow
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Medium
Soil reaction: Strongly acid to mildly alkaline throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the bedrock at a depth of 40 to 60 inches
Shrink-swell potential: High

Most areas are used as woodland. The rest are used for cultivated crops or for hay.

This soil generally is moderately well suited to cultivated crops, but it is poorly suited to flue-cured tobacco. The surface layer is very friable and can be easily tilled when moist. If the soil is tilled when wet, however, it becomes cloddy as it dries. The hazard of erosion is a major management concern in cultivated areas. Because of the slow permeability in the subsoil, wetness occasionally delays planting during a wet spring. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, stripcropping, and growing cover crops, and including grasses and legumes in the cropping system help to maintain tilth and control runoff and erosion in cultivated areas. Tilth can be maintained or improved by mixing organic matter into the soil.

This soil generally is suitable as a site for water-management structures, especially terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

This soil generally is suited to animal waste lagoons. It is a good site for ponds, but the supply of water on the ridges is insufficient to keep a pond full in most areas. The soil is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope and a slow rate of water infiltration allow excess water to run off the surface, increasing the hazards of erosion and nutrient loss.

This soil generally is well suited to pasture and hay, but it is not well suited to alfalfa. Measures that establish and maintain a mixture of grasses and legumes and prevent overgrazing are the major management needs. Proper stocking rates and rotation of livestock among pastures help to prevent overgrazing and allow the pasture plants to recover. Overgrazing and grazing during wet periods, when the ground is soft, cause compaction of the surface layer and thus increase the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. The trees that are suitable for planting include loblolly pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation.

This soil is not so well suited to community development as many of the other soils in the survey area. The slow permeability, the high shrink-swell potential, and low strength are the main limitations. The slow permeability is a limitation on sites for septic tank absorption fields. A different method of sewage disposal or a better suited soil should be considered. The shrink-swell potential is a limitation on sites for dwellings, but reinforcing the foundations with steel and backfilling around the foundations with better suited soil material help to overcome this limitation. Low strength is as limitation on sites for local roads and streets. It generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIe.

12C—Enott fine sandy loam, 7 to 15 percent slopes. This soil is deep over soft bedrock, strongly sloping, and well drained. It is on the narrow shoulders and side slopes of low ridges. Areas range from about 5 to 15 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, brownish yellow fine sandy loam
6 to 10 inches, brownish yellow fine sandy loam that has strong brown mottles

Subsoil:
10 to 18 inches, strong brown clay that has yellowish red, relict mottles
18 to 29 inches, yellowish brown clay
29 to 33 inches, light olive brown sandy clay loam that has greenish gray remnants of weathered saprolite

Substratum:
33 to 42 inches, greenish gray, light yellowish brown, and light olive brown fine sandy loam

Bedrock:
42 to 53 inches, greenish gray, light olive brown, and light yellowish brown, weathered bedrock that crushes to fine sandy loam

Similar inclusions in this unit are soils that have a red subsoil.

Included with this soil in mapping are intermingled areas of the very deep, well drained Appling soils, the deep, moderately well drained Orange soils, and the shallow, well drained Wilkes soils. Appling soils are in the slightly higher areas, Orange soils are in the lower areas near the base of the slopes, and Wilkes soils are mainly at the end of ridges. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Slow
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Medium
Soil reaction: Strongly acid to mildly alkaline throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the bedrock at a depth of 40 to 60 inches
Shrink-swell potential: High

Most areas are used as woodland. The rest are used for cultivated crops or for hay.

This soil generally is moderately well suited to cultivated crops, but it is poorly suited to flue-cured tobacco. The surface layer is very friable and can be easily tilled when moist. If the soil is tilled when wet, however, it becomes cloddy as it dries. The hazard of erosion is a major management concern in cultivated areas. Because of the slow permeability in the subsoil, wetness occasionally delays planting during a wet spring. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, and growing cover crops, and including grasses and legumes in the cropping system help to maintain tilth and control runoff and erosion in cultivated areas. Tilth can be maintained or improved by mixing organic matter into the soil.

This soil generally is suitable as a site for water-management structures, especially terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The soil is a good site for ponds. It is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope and a slow rate of water infiltration allow excess water to run off the surface rapidly, increasing the hazards of erosion and nutrient loss.

This soil generally is well suited to pasture and hay, but it is not well suited to alfalfa. Measures that establish and maintain a mixture of grasses and legumes and prevent overgrazing are the major management needs. Proper stocking rates and rotation of livestock among pastures help to prevent overgrazing and allow the pasture plants to recover. Overgrazing and grazing during wet periods, when the ground is soft, cause compaction of the surface layer and thus increase the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. The trees that are suitable for

planting include loblolly pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation.

This soil is not so well suited to community development as many of the other soils in the survey area. The slow permeability, the slope, the high shrink-swell potential, and low strength are the main limitations. The slow permeability is a limitation on sites for septic tank absorption fields. A different method of sewage disposal or a better suited soil should be considered. The shrink-swell potential is a limitation on sites for dwellings, but reinforcing the foundations with steel and backfilling around the foundations with better suited soil material help to overcome this limitation. Low strength is a limitation on sites for local roads and streets. It generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIIe.

12D—Enott fine sandy loam, 15 to 25 percent slopes. This soil is deep over soft bedrock, moderately steep, and well drained. It is on the narrow side slopes of low ridges. Areas range from about 5 to 15 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 6 inches, brownish yellow fine sandy loam
- 6 to 10 inches, brownish yellow fine sandy loam that has strong brown mottles

Subsoil:
- 10 to 18 inches, strong brown clay that has yellowish red, relict mottles
- 18 to 29 inches, yellowish brown clay
- 29 to 33 inches, light olive brown sandy clay loam that has greenish gray remnants of weathered saprolite

Substratum:
- 33 to 42 inches, greenish gray, light yellowish brown, and light olive brown fine sandy loam

Bedrock:
- 42 to 53 inches, greenish gray, light olive brown, and light yellowish brown, weathered bedrock that crushes to fine sandy loam

Similar inclusions in this unit are soils that have a red subsoil.

Included with this soil in mapping are intermingled areas of the very deep, well drained Appling soils, the deep, moderately well drained Orange soils, and the shallow, well drained Wilkes soils. Appling soils are in the slightly higher areas, Orange soils are in the lower areas near the base of the slopes, and Wilkes soils are mainly at the end of ridges. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Slow
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Medium
Soil reaction: Strongly acid to slightly acid in the upper part of the profile and slightly acid to neutral in the lower part
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the bedrock at a depth of 40 to 60 inches
Shrink-swell potential: High

Most areas are used as woodland. The rest are used for pasture or hay.

This soil is poorly suited to cultivated crops. The surface layer is very friable and can be easily tilled when moist. If the soil is tilled when wet, however, it becomes cloddy as it dries. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Because of the slow permeability in the subsoil, wetness occasionally delays planting during a wet spring. Applying a system of conservation tillage, stripcropping, growing cover crops, and including grasses and legumes in the cropping system help to maintain tilth and control runoff and erosion in cultivated areas. Tilth can be maintained or improved by mixing organic matter into the soil.

This soil generally is suitable as a site for water-management structures, especially terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The soil is a fair site for ponds. Because of the slope, the impoundment area is small in relation to the height of the dam. The soil is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting

the mixture in thin layers improve the suitability for embankments.

This soil generally is moderately well suited to pasture and hay, but it is not suited to alfalfa. Measures that establish and maintain a mixture of grasses and legumes and prevent overgrazing are the major management needs. Proper stocking rates and rotation of livestock among pastures help to prevent overgrazing and allow the pasture plants to recover. Overgrazing and grazing during wet periods, when the ground is soft, cause compaction of the surface layer and thus increase the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. The trees that are suitable for planting include loblolly pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation.

This soil is not so well suited to community development as many of the other soils in the survey area. The slow permeability, the slope, the high shrink-swell potential, and low strength are the main limitations. The slow permeability and the slope are limitations on sites for septic tank absorption fields. A different method of sewage disposal or a better suited soil should be considered. The slope is a limitation on sites for dwellings and for local roads and streets. Considerable cutting and filling are required to establish a level foundation or road base. The shrink-swell potential is a limitation on sites for dwellings, but reinforcing the foundations with steel and backfilling around the foundations with better suited soil material help to overcome this limitation. Low strength is a limitation on sites for local roads and streets. It generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IVe.

13D—Goldston very channery silt loam, 15 to 35 percent slopes. This soil is shallow, moderately steep and steep, and excessively drained. It is on the sides of ridges on Smith Mountain. Areas generally are long, narrow, and winding and range from about 10 to 100 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown very channery silt loam

Subsoil:
3 to 15 inches, yellowish brown very channery silt loam

Bedrock:
15 to 22 inches, weathered, multicolored phyllite bedrock that crushes to silt loam
22 inches, hard phyllite bedrock

Similar inclusions in this unit are soils that are 10 to 20 inches deep over bedrock.

Included with this soil in mapping are small areas of the well drained Tatum soils. These soils are in scattered areas throughout the unit. They are deeper over bedrock than the Goldston soil. Also included are some areas of rock outcrop. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Extremely acid to moderately acid
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: 10 to 20 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 10 to 20 inches
Shrink-swell potential: Low

All areas are wooded.

The slope hinders the safe operation of farm equipment. Because of the slope, this soil is generally unsuited to cultivated crops. It is highly erodible. Tilling the soil increases the hazard of erosion. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil generally is not well suited to water-management structures. The bedrock underlying the soil interferes with the construction of some terraces and diversions, and the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate and droughtiness, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to

ponds. The moderately rapid permeability can result in seepage in the reservoir area and piping in the dam. Because of the slope, the pond reservoir area is small in relation to the height of the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is poorly suited to pasture and hay. Because of droughtiness, establishing or maintaining high-quality forage is difficult. The slope hinders the safe operation of farm equipment.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 105 cubic feet per acre. The trees that are suitable for planting include loblolly pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The slope limits the use of equipment and results in a hazard of erosion, particularly in areas that are disturbed during harvesting activities.

The slope, the depth to bedrock, and droughtiness are the main limitations affecting community development. The depth to bedrock and the slope are limitations on sites for septic tank absorption fields and excavations and for most types of buildings. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs. The slope and droughtiness adversely affect lawns and landscaping.

The capability subclass is VIIs.

14C—Goldston-Tatum complex, 7 to 15 percent slopes. These soils are shallow or deep, strongly sloping, and well drained to excessively drained. They are on the narrow shoulders and side slopes of ridges on and at the base of Smith Mountain. Areas are long and narrow or irregularly shaped and range from about 10 to 200 acres in size.

This map unit is about 60 percent Goldston soil, 30 percent Tatum soil, and 10 percent other soils. The Goldston and Tatum soils occur as areas so intermingled that mapping them separately is not practical.

The typical sequence, depth, and composition of the layers in the Goldston soil are as follows—

Surface layer:
0 to 3 inches, dark yellowish brown very channery silt loam

Subsoil:
3 to 15 inches, yellowish brown very channery silt loam

Bedrock:
15 to 22 inches, weathered, multicolored phyllite bedrock that crushes to silt loam
22 inches, hard phyllite bedrock

The typical sequence, depth, and composition of the layers in the Tatum soil are as follows—

Surface layer:
0 to 6 inches, brown gravelly loam

Subsoil:
6 to 28 inches, red clay
28 to 36 inches, red silty clay loam

Substratum:
36 to 54 inches, brownish yellow and yellowish red silt loam

Bedrock:
54 to 65 inches, brownish yellow, weathered bedrock that crushes to loam

Similar inclusions in this unit are soils that are 10 to 20 inches deep over bedrock.

Included with these soils in mapping are areas of rock outcrop. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Goldston—moderately rapid; Tatum—moderate
Available water capacity: Goldston—very low; Tatum—low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Goldston—extremely acid to moderately acid; Tatum—very strongly or strongly acid
Surface runoff: Rapid
Erosion potential: High
Depth to weathered bedrock: Goldston—10 to 20 inches; Tatum—40 to 60 inches
Water table: At a depth of more than 72 inches
Root zone: Goldston—restricted by the weathered bedrock at a depth of 10 to 20 inches; Tatum—restricted by the weathered bedrock at a depth of 40 to 60 inches
Shrink-swell potential: Goldston—low; Tatum—moderate

All areas are wooded.

The Goldston soil is poorly suited to cultivated crops. The surface layer is very friable, but tilth is poor because of the high content of phyllite fragments throughout the soil. Because of the shallowness to bedrock, the soil is droughty during the growing season. The response of crops to applications of lime and fertilizer generally is limited by the low available water

capacity. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

The Tatum soil is well suited to cultivated crops. The surface layer is friable and can be easily tilled when moist. High acidity and a high content of aluminum are the major limitations.

These soils generally are not well suited to water-management structures. The bedrock in the Goldston soil interferes with the construction of some terraces and diversions. Because of the rapid runoff rate and droughtiness in the Goldston soil, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock in the Goldston soil and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soils are poorly suited to ponds. The moderately rapid permeability in the Goldston soil can result in seepage in the reservoir area and piping in the dam. A soil that is deeper over bedrock would be a better site for ponds.

These soils are moderately well suited to pasture and hay. Because of droughtiness in the Goldston soil, establishing or maintaining high-quality forage is difficult. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of these soils for loblolly pine is high. The estimated annual production of wood is 105 cubic feet per acre on both soils. The trees that are suitable for planting include loblolly pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The depth to bedrock limits the rooting depth and thus results in a hazard of windthrow.

The slope, the depth to bedrock in the Goldston soil, the moderate permeability in the Tatum soil, and droughtiness are the main limitations affecting community development. The depth to bedrock and the moderate permeability are limitations on sites for septic tank absorption fields and excavations. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs. The slope and droughtiness adversely affect lawns and landscaping.

The capability subclass is VIs in areas of the Goldston soil and IIIe in areas of the Tatum soil.

15E—Goldston-Rock outcrop complex, 35 to 60 percent slopes. This map unit consists of a shallow, very steep, excessively drained Goldston soil intermingled with outcrops of phyllite. The unit is on the sides of ridges and at the head of drainageways on Smith Mountain. Areas generally are broad and irregularly shaped and range from about 20 to 900 acres in size.

The map unit is about 35 percent Rock outcrop, 55 percent Goldston very channery silt loam, and 10 percent other soils. The Goldston soil and Rock outcrop occur as areas so small or so intermingled that mapping them separately is not practical.

The typical sequence, depth, and composition of the layers in the Goldston soil are as follows—

Surface layer:

0 to 3 inches, dark yellowish brown very channery silt loam

Subsoil:

3 to 15 inches, yellowish brown very channery silt loam

Bedrock:

15 to 22 inches, weathered, multicolored phyllite bedrock that crushes to silt loam

22 inches, hard phyllite bedrock

The Rock outcrop is several inches to more than 6 feet high. Large areas of the Rock outcrop are at the head of drainageways.

Similar inclusions in this unit are soils that are 10 to 20 inches deep over bedrock or have stones on the surface.

Included in this map unit in mapping are small areas of the well drained Tatum soils. These soils are in scattered areas throughout the unit. They are deeper over bedrock than the Goldston soil. Dissimilar inclusions make up about 15 percent of the unit.

Important properties of the Goldston soil—

Permeability: Moderately rapid
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Extremely acid to moderately acid
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: 10 to 20 inches to weathered bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the weathered bedrock at a depth of 10 to 20 inches
Shrink-swell potential: Low

All areas are wooded.

Because of the slope, the Rock outcrop, and rock fragments, this unit generally is unsuited to cultivated crops. These limitations hinder the safe operation of farm equipment. The Goldston soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This map unit generally is not well suited to water-management structures. The bedrock underlying the Goldston soil interferes with the construction of some terraces and diversions, and the slope, the Rock outcrop, and rock fragments hinder the safe operation of construction equipment. Because of the very rapid runoff rate and droughtiness, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. This map unit is poorly suited to ponds. The moderately rapid permeability can result in seepage in the reservoir area and piping in the dam. Because of the slope, the pond reservoir area is small in relation to the height of the dam. A soil that is less steep and is deeper over bedrock would be a better site for ponds.

This map unit is poorly suited to pasture and hay. Because of droughtiness, establishing or maintaining high-quality forage is difficult. The slope, the Rock outcrop, and rock fragments hinder the safe operation of farm equipment.

The potential productivity of the Goldston soil for loblolly pine is high. The estimated annual production of wood is 105 cubic feet per acre. The trees that are suitable for planting include loblolly pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The slope and the Rock outcrop limit the use of equipment. The slope results in a hazard of erosion, particularly in areas that are disturbed during harvesting activities.

The slope, the depth to bedrock, and the Rock outcrop are the main limitations affecting community development. The depth to bedrock and the slope are limitations on sites for septic tank absorption fields and excavations and for most types of buildings.

The capability subclass is VIIe.

16B—Helena sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the smooth or slightly concave summits of ridges. Areas are irregularly shaped and range from about 3 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches, dark grayish brown sandy loam
5 to 14 inches, light yellowish brown sandy loam

Subsoil:
14 to 18 inches, light yellowish brown sandy clay loam
18 to 27 inches, olive yellow clay that has light gray mottles
27 to 37 inches, light gray clay loam that has olive yellow and reddish yellow mottles
37 to 50 inches, light olive gray sandy clay loam that has yellowish brown and reddish yellow mottles

Substratum:
50 to 65 inches, light olive gray sandy clay loam

Included with this soil in mapping are areas of the well drained Appling, Enott, and Mattaponi soils. Appling and Mattaponi soils are on gently sloping ridges and are at a higher elevation than the Helena soil. Enott soils are in broad, smooth, slightly concave depressions. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Slow
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Extremely acid to strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium

Depth to bedrock: More than 60 inches
Water table: Perched at a depth of 1.5 to 2.5 feet from January through April
Root zone: More than 60 inches
Shrink-swell potential: High

Most areas are used for cultivated crops, hay, or pasture. The rest are wooded.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops. The most common crops are tobacco, small grain, and corn. The surface layer is very friable and can be easily tilled, but wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, establishing grassed waterways, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth and control erosion.

Wetness is a limitation on sites for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

Wetness is a limitation on sites for animal waste lagoons. This soil generally is a good site for ponds. It is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. Irrigation usually is not needed because of the natural wetness. Tile drainage generally is not effective because of the slow permeability in the subsoil. Diversion ditches help to channel excess surface water away from cultivated fields.

This soil is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 115 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Loblolly pine, Virginia pine, and yellow-poplar are the most common tree species. The soil is soft when wet. As a result, the use of heavy timber equipment is limited during wet periods.

Wetness, the slow permeability, the shrink-swell potential, and low strength are the main limitations affecting community development. The wetness and the slow permeability are limitations on sites for septic tank absorption fields. An alternative method of sewage disposal or a soil that is better suited to septic tank absorption fields should be selected. The wetness and the shrink-swell potential are limitations on sites for dwellings with basements. Installing drainage tile under and around the foundation and backfilling with gravel to the surface can help to overcome the wetness if a suitable drainage outlet is available. Backfilling also helps to prevent the structural damage caused by shrinking and swelling. Low strength and the high shrink-swell potential are limitations on sites for local roads and streets. They generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIe.

16C—Helena sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on the smooth or slightly concave shoulders and side slopes of ridges. Areas are irregularly shaped and range from about 3 to 10 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches, dark grayish brown sandy loam

Subsurface layer:
5 to 14 inches, light yellowish brown sandy loam

Subsoil:
14 to 18 inches, light yellowish brown sandy clay loam
18 to 27 inches, olive yellow clay that has light gray mottles
27 to 37 inches, light gray clay loam that has olive yellow and reddish yellow mottles
37 to 50 inches, light olive gray sandy clay loam that has yellowish brown and reddish yellow mottles

Substratum:
50 to 65 inches, light olive gray sandy clay loam

Included with this soil in mapping are small areas of the well drained Appling, Enott, and Mattaponi soils. Appling and Mattaponi soils are on low ridges and in the higher areas. Enott soils are in landscape positions similar to those of the Helena soil. Also included are wet spots near the base of the slopes. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Slow
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Extremely acid to strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: Perched at a depth of 1.5 to 2.5 feet from January through April
Root zone: More than 60 inches
Shrink-swell potential: High

Most areas are used as woodland. A few small areas are used as cropland or pasture.

This soil is moderately well suited to cultivated crops. The most common crops are tobacco and small grain. The surface layer is very friable and can be easily tilled, but wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, establishing grassed waterways, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth and control erosion.

The slope and wetness are limitations on sites for water-management structures, including terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The soil generally is a good site for ponds. It is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. Irrigation usually is not needed because of the natural wetness. Tile drainage generally is not effective because of the slow permeability in the subsoil. Diversion ditches help to channel excess surface water away from cultivated fields.

This soil is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 115 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Loblolly pine, Virginia pine, and yellow-poplar are the most common tree species. The soil is soft when wet. As a result, the use of heavy timber equipment is limited during wet periods.

Wetness, the slow permeability, the shrink-swell potential, the slope, and low strength are the main limitations affecting community development. The wetness, the slow permeability, and the slope are limitations on sites for septic tank absorption fields. An alternative method of sewage disposal or a soil that is better suited to septic tank absorption fields should be selected. The wetness, the shrink-swell potential, and the slope are limitations on sites for dwellings with basements. Installing drainage tile under and around the foundation and backfilling with gravel to the surface can help to overcome the wetness if a suitable drainage outlet is available. Backfilling also helps to prevent the structural damage caused by shrinking and swelling. Low strength and the high shrink-swell potential are limitations on sites for local roads and streets. They generally can be overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIIe.

17B—Hiwassee loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on high terraces along large streams. Areas are

irregularly shaped and range from about 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown loam

Subsoil:
6 to 28 inches, dark red clay
28 to 44 inches, dark red clay that has strong brown mottles
44 to 65 inches, dark reddish brown clay loam that has strong brown and red mottles

Similar inclusions in this unit are Cecil and Cullen soils and soils that have a gravelly or cobbly surface layer.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid to slightly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Large areas are used for pasture or hay, and some areas are used for cultivated crops. The rest are wooded.

This soil is well suited to cultivated crops. The surface layer is very friable and can be easily tilled when moist, but it can become cloddy if tilled when too wet. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, and including grasses and legumes in the cropping system help to control erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 120 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as such drum chopping and prescribed burning. Loblolly pine and yellow-poplar are suitable for planting.

The moderate permeability and low strength are the main limitations affecting community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by increasing the size of the absorption field. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIe.

18B3—Hiwassee clay loam, 2 to 7 percent slopes, severely eroded. This soil is very deep, gently sloping, and well drained. It is on high terraces along large streams (fig. 4). Areas are irregularly shaped and range from about 3 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown clay loam

Figure 4.—A deep road cut in an area of Hiwassee clay loam, 2 to 7 percent slopes, severely eroded, on a high terrace. The cut has exposed stone lines.

Subsoil:
- 6 to 28 inches, dark red clay
- 28 to 44 inches, dark red clay that has strong brown mottles
- 44 to 65 inches, dark reddish brown clay loam that has strong brown and red mottles

Similar inclusions in this unit are Cecil and Cullen soils and soils that have a gravelly or cobbly surface layer.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid to slightly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Large areas are used for pasture or hay, and some areas are used for cultivated crops. The rest are wooded.

This soil is moderately well suited to cultivated crops. The surface layer is friable and can be easily tilled when moist, but it becomes cloddy if tilled when too wet or too dry. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, and including grasses and legumes in the cropping system reduce the hazard of erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 95 cubic feet per acre. The survival and growth of seedlings are limited on this severely eroded soil. Proper site preparation, such as drum chopping and prescribed burning, helps to establish seedlings and increases productivity. Loblolly pine and yellow-poplar are suitable for planting.

The moderate permeability and low strength are the main limitations affecting community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by increasing the size of the absorption field. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIIe.

18C3—Hiwassee clay loam, 7 to 15 percent slopes, severely eroded. This soil is very deep, strongly sloping, and well drained. It is on the side slopes of high terraces along large streams. Areas are irregularly shaped and range from about 3 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown clay loam

Subsoil:
6 to 28 inches, dark red clay
28 to 44 inches, dark red clay that has strong brown mottles
44 to 65 inches, dark reddish brown clay loam that has strong brown and red mottles

Similar inclusions in this unit are Cecil and Cullen soils and soils that have a gravelly or cobbly surface layer.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid to slightly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Large areas are used for pasture or hay, and some areas are used for cultivated crops. The rest are wooded.

This soil is poorly suited to cultivated crops. The surface layer is friable and can be easily tilled when moist, but it becomes cloddy if tilled when too wet or too dry. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of

conservation tillage, growing cover crops, and including grasses and legumes in the cropping system help to control erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. Erosion is a hazard because of the slope. It can be controlled during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope is a limitation on sites for ponds and animal waste lagoons. Considerable cutting and filling are necessary to establish a level lagoon floor. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the soil is highly erodible and the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is moderately well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 95 cubic feet per acre. The survival and growth of seedlings are limited on this severely eroded soil. Proper site preparation, such as drum chopping and prescribed burning, helps to establish seedlings and increases productivity. Loblolly pine and yellow-poplar are suitable for planting.

The slope, the moderate permeability, and low strength are the main limitations affecting community development. The moderate permeability and the slope are limitations on sites for septic tank absorption fields, but these limitations generally can be overcome by increasing the size of the absorption field and installing it on the contour. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material. Cutting and filling are required to establish a level roadbed.

The capability subclass is IVe.

19B—Hiwassee cobbly sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on high terraces along large streams. Areas are irregularly shaped and range from about 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown cobbly sandy loam

Subsoil:
6 to 28 inches, dark red clay
28 to 44 inches, dark red clay that has strong brown mottles
44 to 65 inches, dark reddish brown clay loam that has strong brown and red mottles

Similar inclusions in this unit are Cecil and Cullen soils and soils that have a gravelly surface layer.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid to slightly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Large areas are used for pasture or hay, and some areas are used for cultivated crops. The rest are wooded.

This soil is moderately well suited to cultivated crops. The surface layer is very friable. The cobbles and gravel in the soil cause damage to tillage equipment and interfere with planting. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, and including grasses and legumes in the cropping system help to control erosion. Growing cover crops and incorporating

crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 120 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as drum chopping and prescribed burning. Loblolly pine and yellow-poplar are suitable for planting.

The moderate permeability, low strength, and the cobbly surface layer are the main limitations affecting community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by increasing the size of the absorption field. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material. The cobbly surface layer adversely affects lawns and landscaping.

The capability subclass is IIIs.

19C—Hiwassee cobbly sandy loam, 7 to 15 percent slopes. This soil is very deep, sloping, and well drained. It is on high terraces along large streams. Areas are irregularly shaped and range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown cobbly sandy loam

Subsoil:
6 to 28 inches, dark red clay
28 to 44 inches, dark red clay that has strong brown mottles
44 to 65 inches, dark reddish brown clay loam that has strong brown and red mottles

Similar inclusions in this unit are Cecil and Cullen soils and soils that have a gravelly surface layer.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid to slightly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Large areas are used for pasture or hay, and some areas are used for cultivated crops. The rest are wooded.

This soil is poorly suited to cultivated crops. The surface layer is very friable. The cobbles and gravel in the soil cause damage to tillage equipment and interfere with planting. The soil is highly erodible. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, and including grasses and legumes in the cropping system help to control erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is not suitable as a site for water-management structures. The cobbles in the surface layer interfere with the construction of terraces and diversions. Because of the large cobbles and the rapid runoff rate, establishing grassed waterways is difficult.

The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope is a limitation on sites for animal waste lagoons and ponds. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil is cobbly and cannot be easily compacted. As a result, it is only a fair source of embankment material. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is moderately well suited to pasture and hay. The cobbles in the surface layer can interfere with seeding. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 120 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as drum chopping and prescribed burning. Loblolly pine and yellow-poplar are suitable for planting.

The moderate permeability, the slope, low strength, and the cobbly surface layer are the main limitations affecting community development. The slope and the moderate permeability are limitations on sites for septic tank absorption fields, but these limitations generally can be overcome by increasing the size of the absorption field and installing it on the contour. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material. The cobbly surface layer adversely affects lawns and landscaping.

The capability subclass is IVs.

20B—Leaksville silt loam, 0 to 4 percent slopes. This soil is moderately deep, nearly level to gently sloping, and poorly drained. It is on low flats, in swales, in slight depressions, and on low, broad ridges. Areas are irregularly shaped and range from about 6 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 7 inches, dark brown silt loam

Subsoil:
7 to 21 inches, grayish brown clay that has yellowish brown mottles

Bedrock:
21 to 30 inches, grayish brown and strong brown, soft shale bedrock that crushes to silt loam
30 inches, dark grayish brown, hard shale bedrock

Included with this soil in mapping are the moderately well drained Sheva soils. These soils are in landscape positions similar to those of the Leaksville soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Slow
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: High
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Slow
Erosion potential: Low
Depth to bedrock: 24 to 60 inches to hard bedrock
Water table: Perched within a depth of 2 feet from December through March
Root zone: Restricted by the hard bedrock at a depth of 24 to 60 inches
Shrink-swell potential: High

Some areas are used for cultivated crops or hay. The rest are wooded.

This soil is moderately well suited to cultivated crops. The most common crops are small grain and corn. The surface layer is very friable and can be easily tilled, but it becomes cloddy if tilled when too wet. Excessive wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. Diversions and grassed waterways help to channel excess water away from depressions and swales, thus preventing ponding. The soil is not highly erodible. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth and control erosion.

Terraces, diversions, and grassed waterways generally are not needed on this nearly level to gently sloping soil. Grassed waterways or diversions are constructed in some areas, however, to channel surface

water away from slight depressions and swales, thus preventing ponding. Seasonal wetness and the depth to bedrock hinder the construction of diversions and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences.

The depth to bedrock and the seasonal high water table are limitations on sites for animal waste lagoons. The depth to bedrock is a limitation on sites for ponds. The soil is a poor source of embankment material because it is wet and cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. Irrigation usually is not needed because of the natural wetness. Tile drainage generally is not effective because of the depth to bedrock and the slow permeability in the subsoil. The construction of ditches is limited by the depth to bedrock.

This soil is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Virginia pine, shortleaf pine, southern red oak, and willow oak are the most common tree species. The soil is soft when wet. As a result, the use of heavy timber equipment is limited during wet periods.

Wetness, the depth to bedrock, the shrink-swell potential, and low strength are the main limitations affecting community development. The wetness and the depth to bedrock are limitations on sites for septic tank absorption fields. An alternative method of sewage disposal or a soil that is better suited to septic tank absorption fields should be selected. The wetness, the depth to bedrock, and the shrink-swell potential are limitations on sites for dwellings with basements. A deeper soil that does not have a seasonal high water table would be a better site for these dwellings. Low strength, the shrink-swell potential, and the wetness are limitations on sites for local roads and streets. They generally can be overcome by strengthening and thickening the base with suitable material and by installing a drainage system.

The capability subclass is IVw.

21D—Madison fine sandy loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the sides of ridges along drainageways and small streams. Areas are generally long and winding and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 3 inches, brown fine sandy loam

Subsoil:
3 to 6 inches, yellowish red clay loam
6 to 19 inches, red clay
19 to 37 inches, red clay loam

Substratum:
37 to 65 inches, red loam saprolite

Similar inclusions in this unit are Cullen soils and soils that are gullied or have stones on the surface.

Included with this soil in mapping are the excessively drained Ashlar soils on the end of ridges and at the base of the slopes. Also included are some areas of rock outcrop. Dissimilar inclusions make up as much as 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are used as woodland. A few small areas are used as pasture or hayland or are cultivated.

This soil is poorly suited to cultivated crops. It is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. The slope hinders the safe operation of farm equipment. The main erosion-control measures in cultivated areas are conservation tillage, cover crops, and a cropping system that includes grasses and legumes. Grassed waterways, stripcropping, terraces, and contour farming help to divert water and control erosion in areas where the slopes are sufficiently long and smooth. Incorporating crop residue into the soil and growing

grasses and legumes increase the content of organic matter.

This soil is only moderately well suited to water-management structures. Soil conditions generally favor terraces and diversions, but the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate and the slope, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

This soil is not suitable for the construction of animal waste lagoons because of the slope. A less sloping soil would be a better site. The soil is a fair site for ponds. The moderate permeability can result in seepage and piping in the reservoir and dam. Because of the slope, the water impoundment area is small in relation to the height of the dam.

This soil is moderately well suited to pasture and hay. The main limitation is the slope, which increases the hazard of erosion and limits the safe operation of farm equipment. Using the soil for pasture or hay helps to control erosion, but overgrazing compacts the surface layer and thus increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation of livestock among pastures, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and red oak are the most common tree species. Constructing logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion. The slope hinders the safe operation of timber equipment.

The slope is the main limitation affecting community development. It limits construction. Considerable cutting and filling are needed. Overcoming the slope is difficult on sites for septic tank absorption fields. If a septic tank absorption field is installed, lateral seepage and surfacing of the effluent in downslope areas are hazards. An alternative method of sewage disposal or a less sloping site should be selected.

The capability subclass is IVe.

21E—Madison fine sandy loam, 25 to 45 percent slopes. This soil is very deep, steep and very steep, and well drained. It is on the narrow side slopes of ridges along drainageways and small streams. Areas are generally long and winding and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 3 inches, brown fine sandy loam

Subsoil:
3 to 6 inches, yellowish red clay loam
6 to 19 inches, red clay
19 to 37 inches, red clay loam

Substratum:
37 to 65 inches, red loam saprolite

Similar inclusions in this unit are soils that are gullied or have stones on the surface.

Included with this soil in mapping are the excessively drained Ashlar soils on the end of ridges and at the base of the slopes. Also included are some areas of rock outcrop. Dissimilar inclusions make up as much as 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are used as woodland. A few small areas are used as pasture or hayland.

The slope hinders the safe operation of farm equipment. Because of the slope, this soil is unsuited to cultivated crops. It is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil is only moderately well suited to water-management structures. Soil conditions generally favor terraces and diversions, but the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate and the slope, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying

lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

This soil is not suitable for the construction of animal waste lagoons because of the slope. A less sloping soil would be a better site. The soil is a fair site for ponds. The moderate permeability can result in seepage and piping in the reservoir and dam. Because of the slope, the water impoundment area is small in relation to the height of the dam.

This soil is moderately well suited to pasture and hay. The main limitation is the slope, which increases the hazard of erosion and limits the safe operation of farm equipment. Using the soil for pasture or hay helps to control erosion, but overgrazing compacts the surface layer and thus increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation of livestock among pastures, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and red oak are the most common tree species. Constructing logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion. The slope hinders the safe operation of timber equipment.

The slope is the main limitation affecting community development. It limits construction. Considerable cutting and filling are needed. Overcoming the slope is difficult on sites for septic tank absorption fields. If a septic tank absorption field is installed, lateral seepage and surfacing of the effluent in downslope areas are hazards. An alternative method of sewage disposal or a less sloping site should be selected. The slope is a limitation on sites for local roads and streets. Considerable cutting and filling are required to establish a level roadbed.

The capability subclass is VIIe.

22B—Mattaponi sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the narrow or broad, convex summits of ridges. Areas are irregularly shaped and range from about 4 to 30 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches, yellowish brown sandy loam

Subsoil:
8 to 33 inches, yellowish brown clay that has red mottles
33 to 41 inches, strong brown and very pale brown sandy clay that has red mottles
41 to 76 inches, strong brown, very pale brown, and brownish yellow sandy clay loam that has red mottles

Substratum:
76 to 99 inches, light gray sandy clay loam that has reddish yellow and red mottles

Similar inclusions in this unit are Appling and Cecil soils and soils that have a surface layer of gravelly sandy loam or are severely eroded and have a surface layer of sandy clay loam.

Included with this soil in mapping are the moderately well drained Helena soils. These soils are in scattered areas throughout the unit. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately slow
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile in unlimed areas
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: Perched at a depth of 3 to 6 feet from December through March
Root zone: More than 60 inches
Shrink-swell potential: Moderate

Most areas are used as cropland. The rest are wooded.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops, especially flue-cured tobacco. The surface layer is very friable and can be easily tilled. Because of the moderately slow permeability, wetness can delay tillage and planting, especially during early spring and following prolonged rainy periods. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to control erosion, maintain the content of organic matter and tilth, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-

management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The seasonal high water table is a limitation on sites for animal waste lagoons, but compacting the floor of the lagoon helps to overcome this limitation. The soil is a good site for ponds, although the supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope and moderately slow permeability of the soil allow excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and shortleaf pine are suitable for planting.

Wetness, the moderately slow permeability, the shrink-swell potential, and low strength are the main limitations affecting community development. The wetness and the moderately slow permeability are limitations on sites for septic tank absorption fields, but these limitations generally can be overcome by increasing the size of the absorption field and installing the field a sufficient distance above the seasonal high water table. The wetness and the shrink-swell potential are limitations on sites for dwellings with basements. Installing drainage pipe under and around the foundation and backfilling with gravel around the foundation can help to overcome the wetness if a suitable outlet is available. The shrink-swell potential can be overcome by strengthening the foundation. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIe.

22C—Mattaponi sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on the narrow, convex shoulders and side slopes of ridges. Areas are irregularly shaped and range from about 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
- 0 to 8 inches, yellowish brown sandy loam

Subsoil:
- 8 to 33 inches, yellowish brown clay that has red mottles
- 33 to 41 inches, strong brown and very pale brown sandy clay that has red mottles
- 41 to 76 inches, strong brown, very pale brown, and brownish yellow sandy clay loam that has red mottles

Substratum:
- 76 to 99 inches, light gray sandy clay loam that has reddish yellow and red mottles

Similar inclusions in this unit are Appling and Cecil soils and soils that have a surface layer of gravelly sandy loam or are severely eroded and have a surface layer of sandy clay loam.

Included with this soil in mapping are the moderately well drained Helena soils. These soils are in scattered areas throughout the unit. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderate or moderately slow
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: Perched at a depth of 3 to 6 feet from December through March
Root zone: More than 60 inches
Shrink-swell potential: Moderate

Most areas are used as cropland. The rest are wooded or pastured.

This soil is moderately well suited to cultivated crops. The surface layer is very friable and can be easily tilled. Because of the moderately slow permeability, wetness can delay tillage and planting, especially during early spring and following prolonged rainy periods. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to control erosion, maintain the content of organic matter and tilth, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The soil is a good site for ponds. It cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope and moderately slow permeability of the soil allow excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and thus increase the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Seeds and seedlings survive and grow well if competing vegetation is controlled. Loblolly pine and yellow-poplar are suitable for planting.

Wetness, the moderately slow permeability, the slope, the shrink-swell potential, and low strength are the main limitations affecting community development. The slope, the wetness, and the moderately slow permeability cannot be easily overcome on sites for septic tank absorption fields. An alternative method of sewage disposal or a soil that is better suited to septic tank absorption fields should be selected. The wetness and the shrink-swell potential are limitations on sites for dwellings with basements. Installing drainage pipe under and around the foundation and backfilling with gravel around the foundation can help to overcome the wetness if a suitable outlet is available. The shrink-swell potential can be overcome by strengthening the foundation. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIIe.

23B—Mayodan fine sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the broad or narrow summits of ridges. Areas are irregularly shaped and range from about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
- 0 to 9 inches, yellowish brown fine sandy loam

Subsoil:
- 9 to 16 inches, yellowish red clay that has red mottles
- 16 to 39 inches, red clay
- 39 to 51 inches, red clay loam saprolite that has reddish yellow mottles

Substratum:
- 51 to 65 inches, red sandy clay loam saprolite that has reddish yellow mottles

Similar inclusions in this unit are soils that have soft bedrock at a depth of 40 to 60 inches or have a stony surface.

Included with this soil in mapping are intermingled areas of the moderately well drained Creedmoor soils, the moderately well drained, moderately deep Sheva soils, and the somewhat poorly drained Leaksville soils. Creedmoor soils are around the head of drainageways, at the base of the slopes, and in small depressions. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low

Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Moderate

Most areas are cultivated. Some areas are used for pasture or hay, and some are wooded.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops. The surface layer is very friable and can be easily tilled. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, and including grasses and legumes in the cropping system reduce the hazard of erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 125 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine is suitable for planting.

The moderate permeability, the shrink-swell potential, and low strength are the main limitations affecting community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by increasing the size of the absorption field. The shrink-swell potential is a limitation on sites for dwellings with basements, but it can be overcome by strengthening the foundation. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIe.

23C—Mayodan fine sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the narrow shoulders and side slopes of ridges along drainageways. Areas generally are long and narrow and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 9 inches, yellowish brown fine sandy loam

Subsoil:
9 to 16 inches, yellowish red clay that has red mottles
16 to 39 inches, red clay
39 to 51 inches, red clay loam that has reddish yellow mottles

Substratum:
51 to 65 inches, red sandy clay loam saprolite that has reddish yellow mottles

Similar inclusions in this unit are soils that have soft bedrock at a depth of 40 to 60 inches or have a stony surface.

Included with this soil in mapping are intermingled areas of the moderately well drained Creedmoor soils, the moderately well drained, moderately deep Sheva soils, and the somewhat poorly drained Leaksville soils. Creedmoor and Leaksville soils are around the head of drainageways, at the base of the slopes, and in small depressions. Sheva soils are in landscape positions similar to those of the Mayodan soil. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Moderate

Most areas are cultivated. Some areas are used for pasture or hay, and some are wooded.

This soil is moderately well suited to cultivated crops. The surface layer is very friable and can be easily tilled. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, and including grasses and legumes in the cropping system reduce the hazard of erosion. Growing cover crops and incorporating crop residue into the soil help to maintain the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The moderate permeability is a limitation on sites for ponds, but compacting the floor of the pond helps to overcome this limitation. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface rapidly, increasing the hazards of erosion and nutrient loss.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 125 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine is suitable for planting.

The slope, the moderate permeability, the shrink-swell potential, and low strength are the main limitations affecting community development. The moderate permeability and the slope are limitations on sites for septic tank absorption fields, but these limitations generally can be overcome by increasing the size of the absorption field and installing it on the contour. The slope and the shrink-swell potential are limitations on sites for dwellings. Cutting and filling are necessary to establish a level foundation. Strengthening the foundation can help to overcome the shrink-swell potential. Low strength and the slope are limitations on sites for local roads and streets. Low strength can be overcome by providing suitable base material, and the slope can be overcome by cutting and filling to establish a level roadbed.

The capability subclass is IIIe.

23D—Mayodan fine sandy loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the sides of ridges. Areas are irregularly sloped and range from about 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 9 inches, yellowish brown fine sandy loam

Subsoil:
9 to 16 inches, yellowish red clay that has red mottles
16 to 39 inches, red clay
39 to 51 inches, red clay loam that has reddish yellow mottles

Substratum:
51 to 65 inches, red sandy clay loam saprolite that has reddish yellow mottles

Similar inclusions in this unit are soils that have soft bedrock at a depth of 40 to 60 inches or have a stony surface.

Included with this soil in mapping are intermingled areas of the moderately well drained Creedmoor soils, the moderately well drained, moderately deep Sheva soils, and the somewhat poorly drained Leaksville soils. Creedmoor and Leaksville soils are around the head of drainageways, at the base of the slopes, and in small depressions. Sheva soils are in landscape positions similar to those of the Mayodan soil. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Moderate

Most areas are used as woodland. A few areas are used as pasture or cropland.

This soil is poorly suited to cultivated crops. The slope hinders the safe operation of most kinds of farm equipment. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, and including grasses and legumes in the cropping system reduce the hazard of erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. Erosion is a hazard during construction. It can be controlled by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers can protect the site until the plant cover has become well established.

Because of the slope, this soil generally is unsuitable as a site for animal waste lagoons. The moderate permeability is a limitation on sites for ponds, but compacting the floor of the pond helps to overcome this limitation. Because of the slope, the water impoundment area is small in relation to the height of the dam.

This soil is moderately well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion. The slope hinders the safe operation of farm equipment.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 125 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine is suitable for planting. Building logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion. The slope hinders the safe operation of timber equipment.

The slope is the main limitation affecting community development. Overcoming the slope is especially difficult on sites for septic tank absorption fields. Even if the septic tank absorption field is installed on the contour, lateral seepage and surfacing of the effluent in downslope areas are hazards. A less sloping soil would be a better site. The slope is a limitation on sites for dwellings and local roads and streets. Considerable cutting and filling are required to establish a level foundation or roadbed.

The capability subclass is IVe.

24B—Meadows gravelly loam, 2 to 7 percent slopes. This soil is shallow over soft bedrock, gently sloping, and somewhat excessively drained. It is on the broad summits of upland slopes and on side slopes bordering small drainageways. Areas generally are irregularly shaped and range from about 5 to 60 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 4 inches, dark reddish brown gravelly loam

Subsoil:
4 to 9 inches, dark reddish brown gravelly loam

Substratum:
9 to 16 inches, reddish brown silt loam saprolite

Bedrock:
16 to 24 inches, weathered, reddish brown siltstone that crushes to silt loam
24 inches, hard, reddish brown siltstone

Included with this soil in mapping are areas of the well drained Stoneville and moderately well drained

Sheva soils. These soils are in scattered areas throughout the unit. They are deeper over bedrock than the Meadows soil. Also included are soils that have a perched seasonal high water table on top of the bedrock during wet periods. These soils are near small, intermittent drainageways. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Strongly acid to slightly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: 10 to 20 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 10 to 20 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used for pasture or hay or for cultivated crops.

This soil is poorly suited to cultivated crops. The surface layer is friable, and tilth is fair. When plowed, however, the surface layer tends to become gravelly because of the shallowness to bedrock. The soil is droughty during the growing season. The response of crops to applications of lime and fertilizer generally is limited by the low available water capacity. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is not well suited to water-management structures. The bedrock underlying the soil interferes with the construction of some terraces and diversions. Because of the runoff rate and droughtiness, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock is the major limitation affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to ponds. The shallowness to bedrock can result in seepage in the reservoir area and around the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is moderately well suited to pasture and hay. Because of droughtiness, establishing or maintaining high-quality forage is difficult. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 90 cubic feet per acre. The trees that are suitable for planting include loblolly pine and eastern white pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation.

The depth to bedrock is the main limitation affecting community development. It is a limitation on sites for septic tank absorption fields and excavations. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs.

The capability subclass is IIIs.

24C—Meadows gravelly loam, 7 to 15 percent slopes. This soil is shallow over soft bedrock, strongly sloping, and somewhat excessively drained. It is on the nose slopes of ridges and on side slopes bordering small drainageways. Areas generally are irregularly shaped and range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 4 inches, dark reddish brown gravelly loam

Subsoil:
4 to 9 inches, dark reddish brown gravelly loam

Substratum:
9 to 16 inches, reddish brown silt loam saprolite

Bedrock:
16 to 24 inches, weathered, reddish brown siltstone that crushes to silt loam
24 inches, hard, reddish brown siltstone

Included with this soil in mapping are areas of the well drained Stoneville and moderately well drained Sheva soils. These soils are in scattered areas throughout the unit. They are deeper over bedrock than the Meadows soil. Also included are soils that have a perched seasonal high water table on top of the bedrock during wet periods. These soils are near small, intermittent drainageways. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Strongly acid to slightly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 10 to 20 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 10 to 20 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used as pasture.

This soil is poorly suited to cultivated crops. The surface layer is friable, and tilth is fair. When plowed, however, the surface layer tends to become gravelly because of the shallowness to bedrock. The soil is droughty during the growing season. The response of crops to applications of lime and fertilizer generally is limited by the low available water capacity. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is not well suited to water-management structures. The bedrock underlying the soil interferes with the construction of some terraces and diversions. Because of the rapid runoff rate and droughtiness, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to ponds. The shallowness to bedrock can result in seepage in the reservoir area and around the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is poorly suited to pasture and hay. Because of droughtiness and the rapid runoff rate, establishing or maintaining high-quality forage is difficult. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 90 cubic feet per acre. The trees that are suitable for planting include loblolly pine and eastern white pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation.

The depth to bedrock and the slope are the main limitations affecting community development. They are limitations on sites for septic tank absorption fields and excavations. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is less steep and is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs.

The capability subclass is IVs.

25B—Orange loam, 0 to 4 percent slopes. This soil is deep, nearly level to gently sloping, and moderately well drained. It is on broad flats in swales and in slight depressions on uplands. Slope is dominantly less than 2 percent but ranges to 4 percent. Areas are irregularly shaped and range from about 3 to 80 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches, dark grayish brown loam
5 to 10 inches, grayish brown loam

Subsoil:
10 to 24 inches, yellowish brown clay that has light brownish gray mottles
24 to 28 inches, light olive brown clay that has light brownish gray mottles

Substratum:
28 to 42 inches, olive sandy clay loam saprolite that has brownish yellow and dark greenish gray mottles

Bedrock:
42 to 55 inches, olive, brownish yellow, and dark greenish gray, weathered bedrock that crushes to fine sandy loam
55 inches, dark greenish gray, hard bedrock

Included with this soil in mapping are areas of the well drained Enott, Poindexter, and Wilkes soils. Enott soils are in the higher landscape positions. All three soils are along the side slopes of drainageways. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Very slow or slow
Available water capacity: Moderate
Content of organic matter: Low or moderate
Natural fertility: High
Soil reaction: Strongly acid or moderately acid in the upper part of the profile and moderately acid to mildly alkaline in the lower part
Surface runoff: Slow
Erosion potential: Low
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: Perched at a depth of 1 to 3 feet from December through May
Root zone: Restricted by the bedrock at a depth of 40 to 60 inches
Shrink-swell potential: High

Most areas are used as woodland. The rest are used as pasture or hayland.

This soil is poorly suited to cultivated crops. The surface layer is very friable and can be easily tilled, but wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. Diversions and grassed waterways help to channel excess water away from depressions and swales, thus preventing ponding. The soil is not highly erodible, but conservation measures are needed in some areas to control low levels of erosion and maintain productivity. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth and control erosion.

Terraces, diversions, and grassed waterways generally are not needed on this nearly level to gently sloping soil. Grassed waterways or diversions are constructed in some areas, however, to channel surface water away from slight depressions and swales, thus preventing ponding. Seasonal wetness and the slow permeability in the subsoil hinder the construction of grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences.

This soil is limited as a site for animal waste lagoons because the high water table influences the water level in the lagoon and can result in pollution. Sealing the lagoon floor with slowly permeable soil material or with a flexible membrane can overcome this limitation. The soil is a good site for ponds. It is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. Irrigation usually is not needed because of the natural wetness. Tile drainage generally is not effective because of the slow permeability in the subsoil. Diversion ditches help to channel excess surface water away from cultivated fields, thus preventing ponding.

This soil is moderately well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Loblolly pine, Virginia pine, sweetgum, and willow oak are the most common tree species. The soil is soft when wet and in most areas is dry only in summer and early fall. Thus, the use of heavy timber equipment is limited.

Wetness, the slow permeability, the shrink-swell potential, the depth to bedrock, and low strength are the main limitations affecting community development. The wetness, the slow permeability, and the depth to bedrock are limitations on sites for septic tank absorption fields. An alternative method of sewage disposal or a soil that is better to septic tank absorption fields should be selected. The wetness and the depth to bedrock are limitations on sites for dwellings with basements. Installing drainage tile under and around the foundation and backfilling with gravel to the surface can help to overcome the wetness if a suitable drainage outlet is available. Low strength is a limitation on sites for local roads and streets. It generally can be

overcome by strengthening and thickening the base with suitable material.

The capability subclass is IIw.

26B—Pacolet fine sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the narrow or broad summits of ridges. It is mainly in the northeast corner of the county, between the Roanoke River and the Sycamore-Level Run area. Areas are irregularly shaped and range from about 6 to 150 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 2 inches, dark brown fine sandy loam

Subsurface layer:
2 to 4 inches, yellowish brown fine sandy loam

Subsoil:
4 to 10 inches, yellowish red loam that has brownish yellow mottles
10 to 18 inches, red clay that has brownish yellow mottles
18 to 27 inches, red clay loam that has brownish yellow mottles
27 to 40 inches, red sandy clay loam that has brownish yellow mottles

Substratum:
40 to 65 inches, mottled red, yellowish red, and brownish yellow sandy loam saprolite

Similar inclusions in this unit are Cecil and Madison soils and Pacolet and other soils that are severely eroded and have a surface layer of sandy clay loam, have stones on the surface, or have a gravelly surface layer.

Included with this soil in mapping are intermingled areas of the excessively drained Ashlar soils, well drained soils that have hard bedrock within 30 inches of the surface, and the well drained Rion soils. Ashlar soils are on nose slopes, along the edge of ridges above steep side slopes, and on narrow ridges. The soils that have hard bedrock within 30 inches of the surface and the Rion soils are in scattered areas throughout the unit. Rion soils have less clay in the subsoil than the Pacolet soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Some areas are used for cultivated crops. Some are used for woodland, pasture, or hay.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops, including flue-cured tobacco. The surface layer is friable and can be easily tilled when moist. The erosion potential generally is medium, but areas where the potential is high or low can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of

the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine and shortleaf pine are suitable for planting.

The moderate permeability and low strength are the main limitations affecting community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but this limitation generally can be overcome by increasing the size of the absorption field. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIe.

26D—Pacolet fine sandy loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the sides of ridges along drainageways and small streams. Areas are generally long and winding and range from about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 2 inches, dark brown fine sandy loam

Subsurface layer:
2 to 4 inches, yellowish brown fine sandy loam

Subsoil:
4 to 10 inches, yellowish red loam that has brownish yellow mottles
10 to 18 inches, red clay that has brownish yellow mottles
18 to 27 inches, red clay loam that has brownish yellow mottles
27 to 40 inches, mottled red, yellowish red, and brownish yellow sandy loam that has brownish yellow mottles

Substratum:
40 to 65 inches, mottled red, yellowish red, and brownish yellow sandy loam saprolite

Similar inclusions in this unit are Cecil and Madison soils and Pacolet and other soils that are severely eroded and have a surface layer sandy clay loam, have stones on the surface, or have a gravelly surface layer.

Included with this soil in mapping are intermingled areas of the excessively drained Ashlar soils, well drained soils that have hard bedrock within 30 inches of the surface, and the well drained Rion soils. Ashlar soils are on nose slopes, along the edge of ridges above steep side slopes, and on narrow ridges. The soils that have hard bedrock within 30 inches of the surface and the Rion soils are in scattered areas throughout the unit. Rion soils have less clay in the subsoil than the Pacolet soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are used as woodland. A few small areas are used as pasture or hayland or are cultivated.

This soil is poorly suited to cultivated crops. It is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. The main erosion-control measures in cultivated areas are conservation tillage, stripcropping, cover crops, and a cropping system that includes grasses and legumes. Grassed waterways, terraces, and contour farming help to divert water and control erosion in areas where the slopes are sufficiently long and smooth. Mixing crop residue into the soil or growing grasses and legumes increase the content of organic matter.

This soil is only moderately well suited to water-management structures. Soil conditions generally favor terraces and diversions, but the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate and the slope, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay or silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has became well established.

This soil is not suitable for the construction of animal waste lagoons because of the slope. A less sloping soil would be a better site. The soil is a fair site for ponds. The moderate permeability can result in seepage and piping in the reservoir and dam. Because of the slope,

the water impoundment area is small in relation to the height of the dam.

This soil is moderately well suited to pasture and hay. The main limitation is the slope, which increases the hazard of erosion and limits the safe operation of farm equipment. Using the soil for pasture or hay helps to control erosion, but overgrazing compacts the surface layer and thus increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation of livestock among pastures, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and red oak are the most common tree species. Building logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion. The slope hinders the safe operation of timber equipment.

The slope is the major limitation affecting community development. It limits construction. Considerable cutting and filling are needed. Overcoming the slope is difficult on sites for septic tank absorption fields. If a septic tank absorption field is installed, lateral seepage and surfacing of the effluent in downslope areas are hazards. The field should be installed on the contour. An alternative method of sewage disposal or a less sloping site should be considered.

The capability subclass is IVe.

26E—Pacolet fine sandy loam, 25 to 45 percent slopes. This soil is very deep, steep and very steep, and well drained. It is on the sides of ridges along drainageways and small streams. Areas are generally long and winding and range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 2 inches, dark brown fine sandy loam

Subsurface layer:
2 to 4 inches, yellowish brown fine sandy loam

Subsoil:
4 to 10 inches, yellowish red loam that has brownish yellow mottles
10 to 18 inches, red clay that has brownish yellow mottles
18 to 27 inches, red clay loam that has brownish yellow mottles
27 to 40 inches, red sandy clay loam that has brownish yellow mottles

Substratum:
40 to 65 inches, mottled red, yellowish red, and brownish yellow sandy loam saprolite

Similar inclusions in this unit are Cecil and Madison soils and Pacolet and other soils that are severely eroded and have a surface layer of sandy clay loam, have stones on the surface, or have a gravelly surface layer.

Included with this soil in mapping are intermingled areas of the excessively drained Ashlar soils, well drained soils that have hard bedrock within 30 inches of the surface, and the well drained Rion soils. Ashlar soils are on nose slopes, along the edge of ridges above steep side slopes, and on narrow ridges. The soils that have hard bedrock within 30 inches of the surface and the Rion soils are in scattered areas throughout the unit. Rion soils have less clay in the subsoil than the Pacolet soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are used as woodland. A few small areas are used as pasture.

The slope hinders the safe operation of farm equipment. Because of the slope, this soil is unsuited to cultivated crops. It is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil is only moderately well suited to water-management structures. Soil conditions generally favor terraces and diversions, but the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate and the slope, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay or silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers

help to protect the site until the plant cover has become well established.

This soil is not suitable for the construction of animal waste lagoons because of the slope. A less sloping soil would be a better site. The soil is a fair site for ponds. The moderate permeability can result in seepage and piping in the reservoir and dam. Because of the slope, the water impoundment area is small in relation to the height of the dam.

This soil is poorly suited to pasture and hay. The main limitation is the slope, which increases the hazard of erosion and limits the safe operation of farm equipment. Using the soil for pasture or hay helps to control erosion, but overgrazing compacts the surface layer and thus increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation of livestock among pastures, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and red oak are the most common tree species. Building logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion. The slope hinders the safe operation of timber equipment.

The slope is the major limitation affecting community development. It limits construction. Considerable cutting and filling are needed. Overcoming the slope is difficult on sites for septic tank absorption fields. If a septic tank absorption field is installed, lateral seepage and surfacing of the effluent in downslope areas are hazards. The field should be installed on the contour. An alternative method of sewage disposal or a less sloping site should be considered.

The capability subclass is VIIe.

27C3—Pacolet sandy clay loam, 7 to 15 percent slopes, severely eroded. This soil is very deep, strongly sloping, and well drained. It is on the narrow shoulders and side slopes of ridges along drainageways and small streams. In most areas it is in the northeast corner of the county, between the Roanoke River and the Sycamore-Level Run area. Areas are long and winding and range from about 6 to 150 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 2 inches, dark brown sandy clay loam

Subsurface layer:
2 to 4 inches, yellowish brown sandy clay loam

Subsoil:
4 to 10 inches, yellowish red sandy clay loam that has brownish yellow mottles
10 to 18 inches, red clay that has brownish yellow mottles
18 to 27 inches, red clay loam that has brownish yellow mottles
27 to 40 inches, red sandy clay loam that has brownish yellow mottles

Substratum:
40 to 65 inches, mottled red, yellowish red, and brownish yellow sandy loam saprolite

Similar inclusions in this unit are Cecil and Madison soils and Pacolet and other soils that have stones on the surface or have a gravelly surface layer.

Included with this soil in mapping are intermingled areas of the excessively drained Ashlar soils, well drained soils that have hard bedrock within 30 inches of the surface, and the well drained Rion soils. Ashlar soils are on nose slopes, along the edge of ridges above steep side slopes, and on narrow ridges. The soils that have hard bedrock within 30 inches of the surface and the Rion soils are in scattered areas throughout the unit. Rion soils have less clay in the subsoil than the Pacolet soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most of the acreage is used as woodland. The rest is used for cultivated crops or pasture.

This soil is poorly suited to cultivated crops. The surface layer is friable and can be easily tilled when moist, but it becomes cloddy if tilled when too wet or too dry. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, and including grasses and legumes in the cropping system help to control erosion. Growing cover crops and incorporating crop residue into the soil increase the

content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the construction of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface rapidly, increasing the hazards of nutrient loss and erosion.

This soil is moderately well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. The survival and growth of seedlings are limited on this severely eroded soil. Proper site preparation, such as drum chopping and prescribed burning, helps to establish seedlings and increases productivity. Loblolly pine and shortleaf pine are suitable for planting.

The slope, the moderate permeability, and low strength are the main limitations affecting community development. The moderate permeability and the slope are limitations on sites for septic tank absorption fields, but these limitations can be overcome by increasing the size of the absorption field and installing it on the contour. The slope is a limitation on sites for dwellings. Cutting and filling are required to establish a level foundation. The slope and low strength are limitations on sites for local roads and streets. They can be overcome by cutting and filling and by providing suitable base material.

The capability subclass is IVe.

28C—Pinkston cobbly sandy loam, 7 to 15 percent slopes. This soil is moderately deep, strongly sloping, and excessively drained. It is on the nose slopes of ridges and on side slopes bordering small drainageways. Areas generally are long and narrow and range from about 6 to 75 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches, dark brown cobbly sandy loam

Subsurface layer:
5 to 8 inches, light yellowish brown cobbly sandy loam

Subsoil:
8 to 13 inches, brownish yellow sandy loam
13 to 18 inches, yellowish brown fine sandy loam that has strong brown mottles and strong brown sandy clay loam

Bedrock:
18 to 29 inches, dark yellowish brown sandy loam saprolite
29 inches, unweathered bedrock

Similar inclusions in this unit are Pinkston and other soils that have stones on the surface.

Included with this soil in mapping are small areas of the well drained, moderately permeable Mayodan, Stoneville, and Meadows soils. These soils are in scattered areas throughout the unit. Mayodan and Stoneville soils are deeper over bedrock than the Pinkston soil, and Meadows soils are shallower over bedrock. Dissimilar inclusions make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 20 to 40 inches to hard bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the hard bedrock at a depth of 20 to 40 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used for pasture or hay.

This soil is generally unsuited to cultivated crops because of the cobbles in the surface layer and droughtiness. The soil is droughty during the growing season. The response of crops to applications of lime and fertilizer generally is limited by the very low available water capacity. The cobbles in the surface layer can cause damage to farm equipment. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil generally is not suitable as a site for water-management structures. The cobbles in the surface layer and the bedrock underlying the soil interfere with the construction of terraces and diversions. Because of the rapid runoff rate and droughtiness, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to ponds. The moderately rapid permeability can result in seepage in the reservoir area and piping in the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is moderately well suited to pasture and hay. Because of droughtiness, establishing or maintaining high-quality forage is difficult. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 90 cubic feet per acre. The trees that are suitable for planting include loblolly pine and Virginia pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation.

The slope, the depth to bedrock, and the cobbles on the surface are the main limitations affecting community development. The depth to bedrock and the slope are limitations on sites for septic tank absorption fields and excavations. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs. The cobbles adversely affect lawns and landscaping.

The capability subclass is IVs.

28D—Pinkston cobbly sandy loam, 15 to 35 percent slopes. This soil is moderately deep, moderately steep and steep, and excessively drained. It is on the nose slopes of ridges and on side slopes bordering small drainageways. Areas generally are long and narrow and range from about 6 to 45 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches, dark brown cobbly sandy loam

Subsurface layer:
5 to 8 inches, light yellowish brown cobbly sandy loam

Subsoil:
8 to 13 inches, brownish yellow sandy loam
13 to 18 inches, yellowish brown fine sandy loam that has strong brown mottles and strong brown sandy clay loam

Bedrock:
18 to 29 inches, dark yellowish brown sandy loam saprolite
29 inches, unweathered bedrock

Similar inclusions in this unit are Pinkston and other soils that have stones on the surface.

Included with this soil in mapping are small areas of the well drained Mayodan, Meadows, and Stoneville soils. Mayodan and Stoneville soils are in scattered areas throughout the unit. They are deeper over bedrock than the Pinkston soil. Meadows soils are shallower over bedrock than the Pinkston soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: 20 to 40 inches to hard bedrock

Water table: At a depth of more than 72 inches
Root zone: Restricted by the hard bedrock at a depth of 20 to 40 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used as pasture.

The slope hinders the safe operation of farm equipment. Because of the slope, this soil is generally unsuited to cultivated crops. It is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil generally is not suitable as a site for water-management structures. The bedrock underlying the soil and the cobbles in the surface layer interfere with the construction of terraces and diversions, and the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate and droughtiness, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to ponds. The moderately rapid permeability can result in seepage in the reservoir area and piping in the dam. Because of the slope, the pond reservoir area is small in relation to the height of the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is poorly suited to pasture. Because of droughtiness, establishing or maintaining high-quality forage is difficult. The slope hinders the safe operation of farm equipment.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 90 cubic feet per acre. The trees that are suitable for planting include loblolly pine and Virginia pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The slope limits the use of equipment and results in a hazard of erosion, particularly in areas that are disturbed during harvesting activities.

The slope and the depth to bedrock are the main limitations affecting community development. The depth to bedrock and the slope are limitations on sites for septic tank absorption fields and excavations and for most types of buildings. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs.

The capability subclass is VIIs.

29C—Pinkston-Mayodan complex, 7 to 15 percent slopes, very stony. These soils are moderately deep or very deep, strongly sloping, and well drained or excessively drained. They are on the nose slopes of ridges and on side slopes bordering small drainageways. The Pinkston soil is very stony, and the Mayodan soil is stony. Most areas range from 6 to 40 acres in size.

This map unit is about 50 percent Pinkston soil, 40 percent Mayodan soil, and 10 percent other soils. The Pinkston and Mayodan soils occur as areas so intermingled that mapping them separately is not practical.

The typical sequence, depth, and composition of the layers in the Pinkston soil are as follows—

Surface layer:
0 to 5 inches, dark brown very stony sandy loam

Subsurface layer:
5 to 8 inches, light yellowish brown cobbly sandy loam

Subsoil:
8 to 13 inches, brownish yellow sandy loam
13 to 18 inches, yellowish brown fine sandy loam that has strong brown mottles and strong brown sandy clay loam

Bedrock:
18 to 29 inches, dark yellowish brown sandy loam saprolite
29 inches, unweathered bedrock

The typical sequence, depth, and composition of the layers in the Mayodan soil are as follows—

Surface layer:
0 to 9 inches, yellowish brown cobbly fine sandy loam

Subsoil:
9 to 16 inches, yellowish red clay that has red mottles
16 to 39 inches, red clay
39 to 51 inches, red clay loam that has reddish yellow mottles

Substratum:
51 to 65 inches, red sandy clay loam saprolite that has reddish yellow mottles

Similar inclusions in this unit are Pinkston, Mayodan, and other soils that do not have stones on the surface.

Included with these soils in mapping are small areas of the well drained Stoneville and Meadows soils. These included soils are in scattered areas throughout the unit. Their subsoil is redder than that of the Pinkston and Mayodan soils. Also included are some small areas of soils that are 20 to 40 inches deep over soft bedrock. Dissimilar inclusions make up about 10 percent of the unit.

Important soil properties—

Permeability: Pinkston—moderately rapid; Mayodan—moderate
Available water capacity: Pinkston—very low; Mayodan—moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: Pinkston—20 to 40 inches to hard bedrock; Mayodan—more than 60 inches
Water table: At a depth of more than 72 inches
Root zone: Pinkston—restricted by the hard bedrock at a depth of 20 to 40 inches; Mayodan—more than 60 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used as pasture.

Because of the very stony surface, these soils are generally unsuited to cultivated crops. They would be poorly suited if the stones were removed. The stoniness limits the use of tillage equipment. The soils are highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

These soils generally are not well suited to water-management structures. The bedrock underlying the Pinkston soil and the stones in both soils interfere with the construction of grassed waterways, terraces, and diversions. Because of the rapid runoff rate on both soils and droughtiness in the Pinkston soil, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock in the Pinkston soil, the very stony surface, and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to ponds. The permeability of both soils can result in seepage in the reservoir area and piping in the dam. A soil that is deeper over bedrock would be a better site for ponds.

These soils are moderately well suited to pasture. Because of droughtiness in the Pinkston soil, establishing or maintaining high-quality forage is difficult. The stones on the surface limit the use of equipment. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity for loblolly pine is high on the Pinkston soil and very high on the Mayodan soil. The estimated annual production of wood is 90 cubic feet per acre on the Pinkston soil and 110 cubic feet per acre on the Mayodan soil. The trees that are suitable for planting include loblolly pine, shortleaf pine, Virginia pine, and eastern white pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The very stony surface limits the use of timber equipment.

The slope, the stoniness, the shrink-swell potential, the depth to bedrock, and low strength are the main limitations affecting community development. The depth to bedrock in the Pinkston soil and the stoniness of both soils are limitations on sites for septic tank absorption fields and excavations. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, the absorption field should be installed in areas of the very deep Mayodan soil. Strengthening foundations helps to overcome the shrink-swell potential. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs. Large stones adversely affect lawns and landscaping.

The capability subclass is VIIs.

29D—Pinkston-Mayodan complex, 15 to 35 percent slopes, very stony. These soils are moderately deep or very deep, moderately steep or steep, and well drained or excessively drained. They are on the side slopes of mountains and in areas bordering drainageways. The Pinkston soil is very stony, and the Mayodan soil is stony. Most areas range from 6 to 50 acres in size.

This map unit is about 60 percent Pinkston soil, 30 percent Mayodan soil, and 10 percent other soils. The

Pinkston and Mayodan soils occur as areas so intermingled that mapping them separately is not practical.

The typical sequence, depth, and composition of the layers in the Pinkston soil are as follows—

Surface layer:
0 to 5 inches, dark brown very stony sandy loam

Subsurface layer:
5 to 8 inches, light yellowish brown cobbly sandy loam

Subsoil:
8 to 13 inches, brownish yellow sandy loam
13 to 18 inches, yellowish brown fine sandy loam that has strong brown mottles and strong brown sandy clay loam

Bedrock:
18 to 29 inches, dark yellowish brown sandy loam saprolite
29 inches, unweathered bedrock

The typical sequence, depth, and composition of the layers in the Mayodan soil are as follows—

Surface layer:
0 to 9 inches, yellowish brown cobbly fine sandy loam

Subsoil:
9 to 16 inches, yellowish red clay that has red mottles
16 to 39 inches, red clay
39 to 51 inches, red clay loam that has reddish yellow mottles

Substratum:
51 to 65 inches, red sandy clay loam saprolite that has reddish yellow mottles

Similar inclusions in this unit are Pinkston, Mayodan, and other soils that do not have stones on the surface. Included with these soils in mapping are small areas of the well drained Stoneville and Meadows soils. These included soils are in scattered areas throughout the unit. Their subsoil is redder than that of the Pinkston and Mayodan soils. Also included are some small areas of soils that are 20 to 40 inches deep over soft bedrock. Dissimilar inclusions make up about 10 percent of the unit.

Important soil properties—

Permeability: Pinkston—moderately rapid; Mayodan—moderate
Available water capacity: Pinkston—very low; Mayodan—moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: Pinkston—20 to 40 inches to hard bedrock; Mayodan—more than 60 inches
Water table: At a depth of more than 72 inches
Root zone: Pinkston—restricted by the hard bedrock at a depth of 20 to 40 inches; Mayodan—more than 60 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used as pasture.

Because of the slope and the stoniness, these soils are generally unsuited to cultivated crops. The slope and the stoniness hinder the safe operation of farm equipment. The soils are highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

These soils generally are not suitable as sites for water-management structures. The bedrock underlying the Pinkston soil and the stones in both soils interfere with the construction of grassed waterways, terraces, and diversions, and the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate on both soil and droughtiness in the Pinkston soil, establishing grassed waterways is difficult.

The depth to bedrock in the Pinkston soil and the stoniness and slope of both soils are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soils are poorly suited to ponds. The permeability of both soils can result in seepage in the reservoir area and piping in the dam. Because of the slope, the pond reservoir area is small in relation to the height of the dam. A soil that is deeper over bedrock would be a better site for ponds.

These soils are moderately well suited to pasture. Because of droughtiness in the Pinkston soil, establishing or maintaining high-quality forage is difficult. The stoniness and the slope hinder the safe operation of farm equipment. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity for loblolly pine is high on the Pinkston soil and very high on the Mayodan soil.

The estimated annual production of wood is 90 cubic feet per acre on the Pinkston soil and 110 cubic feet per acre on the Mayodan soil. The trees that are suitable for planting include loblolly pine, shortleaf pine, Virginia pine, and eastern white pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The slope and the stoniness limit the use of timber equipment. The slope results in a hazard of erosion, particularly in areas that are disturbed during harvesting activities.

The slope of both soils and the bedrock in the Pinkston soil are the main limitations affecting community development. The depth to bedrock and the slope are limitations on sites for septic tank absorption fields and excavations and for most types of buildings. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, the absorption field should be installed in areas of the very deep Mayodan soil. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs.

The capability subclass is VIIs.

29E—Pinkston-Mayodan complex, 35 to 50 percent slopes, very stony. These soils are moderately deep or very deep, steep, and well drained or excessively drained. They are on the side slopes of mountains and in areas bordering drainageways. The Pinkston soil is very stony, and the Mayodan soil is stony. Most areas range from 10 to 40 acres in size.

This map unit is about 60 percent Pinkston soil, 30 percent Mayodan soil, and 10 percent other soils. The Pinkston and the Mayodan soils occur as areas so closely intermingled that mapping them separately is not practical.

The typical sequence, depth, and composition of the layers in the Pinkston soil are as follows—

Surface layer:
0 to 5 inches, dark brown very stony sandy loam

Subsurface layer:
5 to 8 inches, light yellowish brown cobbly sandy loam

Subsoil:
8 to 13 inches, brownish yellow sandy loam
13 to 18 inches, yellowish brown fine sandy loam that has strong brown mottles and strong brown sandy clay loam

Bedrock:
18 to 29 inches, dark yellowish brown sandy loam saprolite
29 inches, unweathered bedrock

The typical sequence, depth, and composition of the layers in the Mayodan soil are as follows—

Surface layer:
0 to 9 inches, yellowish brown cobbly fine sandy loam

Subsoil:
9 to 16 inches, yellowish red clay that has red mottles
16 to 39 inches, red clay
39 to 51 inches, red clay loam that has reddish yellow mottles

Substratum:
51 to 65 inches, red sandy clay loam saprolite that has reddish yellow mottles

Similar inclusions in this unit are Pinkston, Mayodan, and other soils that do not have stones on the surface.

Included with these soils in mapping are small areas of the well drained Stoneville and Meadows soils. These included soils are in scattered areas throughout the unit. Their subsoil is redder than that of the Pinkston and Mayodan soils. Also included are some small areas of soils that are 20 to 40 inches deep over soft bedrock. Dissimilar inclusions make up about 10 percent of the unit.

Important soil properties—

Permeability: Pinkston—moderately rapid; Mayodan—moderate
Available water capacity: Pinkston—very low; Mayodan—moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: Pinkston—20 to 40 inches to hard bedrock; Mayodan—more than 60 inches
Water table: At a depth of more than 72 inches
Root zone: Pinkston—restricted by the hard bedrock at a depth of 20 to 40 inches; Mayodan—more than 60 inches
Shrink-swell potential: Low

Most areas are wooded. A small acreage is used as unimproved pasture.

Because of the slope and the stoniness, these soils are generally unsuited to cultivated crops. The slope and the stoniness hinder the safe operation of farm equipment. The soils are highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

These soils generally are not suitable as sites for water-management structures. The bedrock underlying the Pinkston soil and the stones in both soils interfere with the construction of grassed waterways, terraces, and diversions, and the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate on both soils and droughtiness in the Pinkston soil, establishing grassed waterways is difficult.

The slope is a major limitation affecting the construction of animal waste lagoons. A soil that is less sloping and is deeper over bedrock would be a better site for lagoons. The soils are poorly suited to ponds. The moderately rapid permeability in the Pinkston soil can result in seepage in the reservoir area and piping in the dam. Because of the slope, the pond reservoir area is small in relation to the height of the dam. A soil that is less steep and is deeper over bedrock would be a better site for ponds.

These soils are poorly suited to pasture. Because of droughtiness in the Pinkston soil, establishing or maintaining high-quality forage is difficult. The slope and the stoniness hinder the safe operation of farm equipment.

The potential productivity for loblolly pine is high on the Pinkston soil and very high on the Mayodan soil. The estimated annual production of wood is 90 cubic feet per acre on the Pinkston soil and 110 cubic feet per acre on the Mayodan soil. The trees that are suitable for planting include loblolly pine, shortleaf pine, Virginia pine, and eastern white pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The slope and the stoniness limit the use of timber equipment. The slope results in a hazard of erosion, particularly in areas that are disturbed during harvesting activities.

The slope is the main limitation affecting community development. It is a limitation on sites for septic tank absorption fields and excavations and for most types of buildings. A soil that is less steep and is deeper over bedrock would be a better site for these uses. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs.

The capability subclass is VIIe.

30—Pits, quarry. This map unit consists of small excavations from which soil and the underlying rock have been removed. Included in mapping are small dumps of waste material.

These excavations provide crushed rock, primarily for commercial purposes.

No land capability classification is assigned.

31C—Poindexter fine sandy loam, 7 to 15 percent slopes. This soil is moderately deep over soft bedrock, strongly sloping, and well drained. It is on the narrow shoulders and side slopes of ridges. Areas generally are irregularly shaped and range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 1 inch, very dark grayish brown fine sandy loam

Subsurface layer:
1 to 10 inches, olive brown fine sandy loam

Subsoil:
10 to 18 inches, dark yellowish brown sandy clay loam
18 to 23 inches, olive brown fine sandy loam

Substratum:
23 to 27 inches, mottled olive brown and brown fine sandy loam saprolite

Bedrock:
27 to 55 inches, partially weathered bedrock that crushes to fine sandy loam
55 inches, hard bedrock

Similar inclusions in this unit are Enott soils and soils that have more clay in the subsoil than the Poindexter soil.

Included with this soil in mapping are the well drained Wilkes soils. These soils are in areas on narrow ridgetops where bedrock is close to the surface. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Content of organic matter: Low
Natural fertility: High
Soil reaction: Strongly acid to neutral
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 20 to 40 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 20 to 40 inches
Shrink-swell potential: Low

Most areas are used as woodland. The rest are used for pasture or cultivated crops.

This soil is moderately well suited to cultivated crops. The surface layer is very friable and can be easily tilled.

The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. The main erosion-control measures in cultivated areas are conservation tillage, stripcropping, grassed waterways, cover crops, and a cropping system that includes grasses and legumes. The soil is droughty, and irrigation is needed during dry periods nearly every year. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil generally is suitable as a site for terraces, diversions, and grassed waterways. It is easily eroded, but the hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The moderately rapid permeability in the lower part of the subsoil is a limitation on sites for animal waste lagoons and pond reservoir areas. Sealing the pond or lagoon with less permeable soil material from a nearby source or with bentonite can help to overcome this limitation. The soil has a high potential for piping and thus is a poor source of material for embankments. The rate at which irrigation water is applied should be monitored carefully because the soil is highly erodible and the slope allows excess water to run off the surface rapidly, increasing the hazards of nutrient loss and erosion.

This soil is moderately well suited to pasture and hay. It is droughty because of the low available water capacity. Drought-tolerant grasses and legumes grow best. Using the soil for pasture or hay helps to control erosion, but overgrazing compacts the surface layer and thus increases the runoff rate and the hazard of erosion. Rotation of livestock among pastures prevents overgrazing and allows the pasture plants to recover.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 90 cubic feet per acre. Seeds and seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as clearing and prescribed burning. Loblolly pine is suitable for planting. Constructing logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion.

The depth to bedrock, the slope, and low strength are the main limitations affecting community development. The depth to bedrock and the slope are limitations on sites for septic tank absorption fields. Installing the absorption field in the deepest areas and on the contour can help to overcome these limitations. The depth to bedrock is a limitation on sites for dwellings with basements. Heavy equipment or explosives can excavate the bedrock. Also, the building can be constructed in areas of the deeper included soils. The slope is a limitation affecting building site development. Cutting and filling are required to establish a level foundation or roadbed. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIIe.

31D—Poindexter fine sandy loam, 15 to 25 percent slopes. This soil is moderately deep over soft bedrock, moderately steep, and well drained. It is on the sides of ridges along drainageways and small streams. Areas generally are long and winding and range from about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 1 inch, very dark grayish brown fine sandy loam

Subsurface layer:
1 to 10 inches, olive brown fine sandy loam

Subsoil:
10 to 18 inches, dark yellowish brown sandy clay loam
18 to 23 inches, olive brown fine sandy loam

Substratum:
23 to 27 inches, mottled olive brown and brown fine sandy loam saprolite

Bedrock:
27 to 55 inches, partially weathered bedrock that crushes to fine sandy loam
55 inches, hard bedrock

Similar inclusions in this unit are Enott soils and the steeper Poindexter soils.

Included with this soil in mapping are the well drained Pacolet and Wilkes soils. Pacolet soils are in scattered areas throughout the unit. Wilkes soils are in the steeper areas where the bedrock is close to the surface. Dissimilar inclusions make up about 30 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Content of organic matter: Low

Natural fertility: High
Soil reaction: Strongly acid to neutral
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: 20 to 40 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 20 to 40 inches
Shrink-swell potential: Low

Most areas are used as woodland. A few small areas are used as pasture or hayland or are cultivated.

This soil is poorly suited to cultivated crops. It is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. The main erosion-control measures in cultivated areas are conservation tillage, stripcropping, cover crops, and a cropping system that includes grasses and legumes. Grassed waterways, terraces, and contour farming help to divert water and control erosion in areas where the slopes are sufficiently long and smooth. Mixing crop residue into the soil or growing grasses and legumes increases the content of organic matter.

This soil is only moderately well suited to water-management structures. Soil conditions generally favor terraces and diversions. The soil is highly erodible, however, and the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate and the slope, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

This soil is not suitable for the construction of animal waste lagoons because of the hazard of seepage and the slope. A better suited, less sloping soil should be considered. The soil is a fair site for ponds. The moderate permeability can result in seepage and piping in the reservoir and dam. Because of the slope, the water impoundment area is small in relation to the height of the dam.

This soil is moderately well suited to pasture and hay. The main limitation is the slope, which increases the hazard of erosion and hinders the safe operation of farm equipment. Using the soil for pasture or hay helps to control erosion, but overgrazing compacts the surface layer and thus increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation of livestock among pastures, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 90 cubic feet per acre. Loblolly pine is suitable for planting. Building logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion. The slope hinders the safe operation of timber equipment.

The slope is the major limitation affecting community development. It limits construction. Considerable cutting and filling are needed. Overcoming the slope is difficult on sites for septic tank absorption fields. If a septic tank absorption field is installed, lateral seepage and surfacing of the effluent in downslope areas are hazards. The absorption field should be installed on the contour. Some other means of sewage disposal or a less sloping soil should be considered.

The capability subclass is IVe.

32C—Rion fine sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the narrow shoulders and side slopes of ridges. Areas generally are irregularly shaped and range from about 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 10 inches, dark yellowish brown fine sandy loam

Subsoil:
10 to 16 inches, brown sandy clay loam
16 to 28 inches, strong brown clay loam that has light yellowish brown mottles
28 to 35 inches, yellowish brown and light red clay loam

Substratum:
35 to 42 inches, strong brown and yellow sandy loam
42 to 65 inches, very pale brown and reddish yellow sandy loam

Included with this soil in mapping are the somewhat excessively drained Ashlar soils and the well drained Cecil, Appling, and Mattaponi soils. Ashlar soils are in the more sloping areas on narrow ridgetops and the points of ridges. Cecil, Appling, and Mattaponi soils have more clay in the subsoil than the Rion soil. Cecil and Appling soils are in the more sloping areas. Mattaponi soils are around the head of drainageways

and on the concave parts of side slopes. Also included are areas of soils that have soft bedrock at a depth of 20 to 40 inches and areas of rock outcrop. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate or moderately rapid
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are used as cropland or pasture. The rest are wooded.

This soil is moderately well suited to cultivated crops. The surface layer is very friable and can be easily tilled when moist. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. The main erosion-control measures in cultivated areas are conservation tillage, stripcropping, grassed waterways, cover crops, and a cropping system that includes grasses and legumes. The soil is droughty, and irrigation is needed during dry periods nearly every year. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of erosion and nutrient loss.

This soil generally is suitable as a site for terraces, diversions, and grassed waterways. It is easily eroded, but the hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The moderately rapid permeability in the lower part of the subsoil is a limitation on sites for animal waste lagoons and pond reservoir areas. Sealing the pond or lagoon with less permeable soil material from a nearby source or with bentonite can help to overcome this limitation. The soil has a high potential for piping and thus is a poor source of material for embankments. The rate at which irrigation water is applied should be monitored carefully because the soil is highly erodible and the slope allows excess water to run off the surface rapidly, increasing the hazards of erosion and nutrient loss.

This soil is well suited to pasture and hay. Using the soil for pasture or hay helps to control erosion, but overgrazing compacts the surface layer and thus increases the runoff rate and the hazard of erosion. Rotation of livestock among pastures prevents overgrazing and allows the pasture plants to recover.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Seeds and seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as clearing and prescribed burning. Loblolly pine is suitable for planting. Constructing logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion.

The slope is the main limitation affecting community development. It is a limitation on sites for septic tank absorption fields, but installing the absorption field on the contour can help to overcome this limitation. The slope is a limitation on sites for dwellings and for local roads and streets. Cutting and filling are necessary to establish a level foundation or roadbed.

The capability subclass is IIIe.

33A—Riverview silt loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, nearly level, and well drained. It is on wide flood plains along rivers and large creeks and is occasionally flooded for very brief periods from winter to early spring. Areas commonly are long and wide and range from about 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 11 inches, dark yellowish brown silt loam

Subsoil:
11 to 43 inches, dark yellowish brown loam

Substratum:
43 to 65 inches, dark yellowish brown loam

Similar inclusions in this unit are Toccoa soils and Riverview soils that have high-chroma mottles below a depth of 40 inches.

Included with this soil in mapping are the well drained State soils, the somewhat poorly drained Chenneby soils, and the poorly drained Wehadkee soils. State soils are on the slightly higher stream terraces. Chenneby and Wehadkee soils are in depressions. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Content of organic matter: Low
Natural fertility: Medium
Soil reaction: Strongly acid or moderately acid
Surface runoff: Slow
Erosion potential: Low
Depth to bedrock: More than 60 inches
Water table: Apparent at a depth of 3 to 5 feet from December through March
Root zone: More than 60 inches
Shrink-swell potential: Low
Flooding: Occasional, from December through March

Most areas are used for cultivated crops. A few areas are used as pasture or woodland.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops. The surface layer is friable and can be easily tilled. Unless the soil is protected, crops can be damaged by flooding on an average of once every 2 to 5 years. The soil is not highly erodible. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, minimize crusting, and increase the rate of water infiltration.

Terraces, diversions, and grassed waterways generally are not needed on this nearly level soil. Grassed waterways are established in some areas, however, to divert surface water to an outlet.

The moderate permeability, the flooding, and the seasonal high water table are limitations on sites for animal waste lagoons. A better drained soil that is not subject to flooding would be a better site. The moderate permeability is a limitation on sites for ponds. Sealing the bottom of the pond with less permeable soil material or with bentonite can help to overcome this limitation. The soil is a poor source of material for embankments because it cannot be easily compacted and is subject to piping. Irrigation usually is not needed because of the natural wetness and the flooding. A drainage system generally is not needed because the seasonal high water table is not within the rooting depth of the commonly grown crops.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, a drainage system, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 155 cubic feet per acre. Loblolly pine is suitable for planting. Seeds and seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning.

The flooding and wetness are the major limitations affecting community development. They are limitations on sites for buildings and for most sanitary facilities. In many areas the soil dries out slowly in spring and after heavy rains. Dikes and levees help to protect limited areas of the soil from flooding. The construction and maintenance of these water-control structures, however, impose additional costs. As a result, buildings should be constructed on a soil that is not limited by flooding.

The capability class is I.

34B—Sheva fine sandy loam, 2 to 7 percent slopes. This soil is moderately deep over soft bedrock, gently sloping, and moderately well drained. It is on the summits and foot slopes of ridges. Areas are irregularly shaped and range from about 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 10 inches, light yellowish brown fine sandy loam

Subsoil:
10 to 19 inches, yellowish brown loam that has strong brown mottles
19 to 29 inches, mottled yellowish brown, grayish brown, and strong brown clay loam

Bedrock:
29 to 56 inches, yellowish brown, partially weathered bedrock that crushes to fine sandy loam
56 inches, hard, yellowish brown bedrock

Similar inclusions in this unit are Sheva soils that have slopes of less than 2 percent and Sheva soils that are underlain by black shale bedrock and have a higher reaction.

Included with this soil in mapping are small areas of the well drained Mayodan soils, the somewhat poorly drained Leaksville soils, and the moderately well drained Creedmoor soils. Mayodan soils are on gently sloping ridges and side slopes. Leaksville soils are in broad, smooth, slightly concave depressions. Creedmoor soils are in landscape positions similar to those of the Sheva soil. They are deeper over hard

bedrock than the Sheva soil. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately slow or moderate
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Extremely acid to strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: 20 to 40 inches to soft bedrock
Water table: Perched at a depth of 1.5 to 2.0 feet from December through April
Root zone: Restricted by the soft bedrock at a depth of 20 to 40 inches
Shrink-swell potential: Low

Most areas are used as woodland. The rest are used as pasture or cropland.

This soil is moderately well suited to cultivated crops. The most common crops are tobacco, small grain, and corn. The surface layer is very friable and can be easily tilled, but wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. The erosion potential generally is medium, but areas where the potential is low or high can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, establishing grassed waterways, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth and control erosion.

The depth to bedrock and the perched water table are limitations on sites for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, replacing the topsoil, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established. Establishing a permanent plant cover may be difficult because of a reduced available water capacity in areas where significant cutting has been necessary.

The depth to bedrock and the perched water table are limitations on sites for animal waste lagoons and ponds. The soil is a poor source of embankment material because it cannot be easily compacted. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. Irrigation usually is not needed because of the natural wetness. Tile drainage generally is not effective because of the moderately slow permeability in the subsoil. Diversion ditches help to channel excess surface water away from cultivated fields.

This soil generally is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 80 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Loblolly pine, Virginia pine, and eastern white pine are the most common tree species. The soil is soft when wet. As a result, the use of heavy timber equipment is limited during wet periods.

The depth to bedrock, wetness, and the moderately slow permeability are the main limitations affecting community development. The depth to bedrock, the wetness, and moderately slow permeability are limitations on sites for septic tank absorption fields. A better suited soil or a different method of sewage disposal should be selected. The depth to bedrock and the wetness are limitations on sites for dwellings with basements. If a basement is desired, a soil that is deeper over bedrock and does not have a perched water table would be a better site. The wetness is a limitation on sites for local roads and streets. It generally can be overcome by installing a drainage system and thickening the base material above the water table.

The capability subclass is IIe.

34C—Sheva fine sandy loam, 7 to 15 percent slopes. This soil is moderately deep, strongly sloping, and moderately well drained. It is on the smooth, slightly concave side slopes of ridges. Areas are irregularly shaped and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 10 inches, light yellowish brown fine sandy loam

Subsoil:
10 to 19 inches, yellowish brown loam that has strong brown mottles
19 to 29 inches, mottled yellowish brown, grayish brown, and strong brown clay loam

Bedrock:
29 to 56 inches, yellowish brown, partially weathered bedrock that crushes to fine sandy loam
56 inches, hard, yellowish brown bedrock

Included with this soil in mapping are small areas of the well drained Mayodan soils. These soils are on the longer, more convex side slopes. Also included are Pinkston soils on the steeper, more convex side slopes. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately slow or moderate
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Extremely acid to strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 20 to 40 inches to soft bedrock
Water table: Perched at a depth of 1.5 to 2.0 feet from December through April
Root zone: Restricted by the soft bedrock at a depth of 20 to 40 inches
Shrink-swell potential: Low

Most areas are used as woodland. Some areas are used as pasture. A few small areas are used as cropland.

This soil is poorly suited to cultivated crops. The surface layer is very friable and can be easily tilled, but wetness can delay tillage and planting, especially during spring and after prolonged rainy periods. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, establishing grassed waterways, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth and control erosion.

The depth to bedrock, the perched water table, and the slope are limitations on sites for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, replacing the topsoil, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established. Establishing a permanent plant cover may be difficult because of a reduced available water capacity in areas where significant cutting has been necessary.

The depth to bedrock, the perched water table, and the slope are limitations on sites for animal waste lagoons and ponds. Irrigation usually is not needed because of the natural wetness. Tile drainage generally is not effective because of the slow permeability in the subsoil. Diversion ditches help to channel excess surface water away from cultivated fields.

This soil generally is well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 80 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled through drum chopping, clearing, cutting, and girdling. Loblolly pine, Virginia pine, sweetgum, and eastern white oak are the most common tree species. The soil is soft when wet. As a result, the use of heavy timber equipment is limited during wet periods.

The depth to bedrock, wetness, the moderately slow permeability, and the slope are the main limitations affecting community development. The depth to bedrock, the wetness, the moderately slow permeability, and the slope are limitations on sites for septic tank absorption fields. A better suited soil or a different method of sewage disposal should be selected. The depth to bedrock and the wetness are limitations on sites for dwellings with basements. If a basement is desired, a soil that is deeper over bedrock and does not have a perched water table would be a better site. The wetness is a limitation on sites for local roads and streets. It generally can be overcome by installing a

drainage system and thickening the base material above the water table.

The capability subclass is IIIe.

35B—State sandy loam, 0 to 4 percent slopes, rarely flooded. This soil is very deep, nearly level to gently sloping, and well drained. It is on low stream terraces. Areas are irregularly shaped and range from about 4 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 9 inches, dark brown sandy loam

Subsoil:
9 to 16 inches, brown sandy clay loam
16 to 27 inches, strong brown clay loam that has yellowish red and light yellowish brown mottles
27 to 38 inches, yellowish brown clay loam that has yellowish red and light yellowish brown mottles
38 to 50 inches, strong brown sandy loam that has light gray mottles

Substratum:
50 to 65 inches, brown sandy loam

Included with this soil in mapping are intermingled areas of the somewhat poorly drained Chenneby soils, the moderately well drained Bolling soils, and the well drained Toccoa soils. Chenneby and Toccoa soils are in the lower landscape positions. Bolling soils are in depressions. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate to rapid
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Low
Depth to bedrock: More than 60 inches
Water table: Apparent at a depth of 4 to 5 feet from December through June
Root zone: More than 60 inches
Shrink-swell potential: Low
Flooding: Rare

Some areas are used for cultivated crops. The rest are used as woodland, pasture (fig. 5), or hayland.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops, including flue-cured tobacco. The surface layer is friable and can be easily tilled when moist. Flooding is not likely under normal weather conditions. The soil is not highly erodible, but conservation measures are needed to control erosion and maintain productivity in some areas. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability and the flooding are limitations on sites for animal waste lagoons and ponds. Compacting the floor of the lagoon or pond helps to prevent seepage. A soil that is not subject to flooding would be a better site. The supply of water is insufficient to keep a pond full in most areas. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 125 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine and yellow-poplar are suitable for planting.

The flooding, the seasonal high water table, the moderate permeability, and low strength are the main limitations affecting community development. The flooding and the seasonal high water table are limitations on sites for septic tank absorption fields and dwellings. A better suited soil should be selected. Low strength and the flooding are limitations on sites for local roads and streets. They can be overcome by

Figure 5.—Pasture in an area of State sandy loam, 0 to 4 percent slopes, rarely flooded.

providing suitable base material and building up the roadbed above the flood plains.

The capability subclass is IIe.

36B—Stoneville silt loam, 2 to 7 percent slopes. This soil is deep over soft bedrock, gently sloping, and well drained. It is on the summits of ridges. Areas are irregularly shaped and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 9 inches, dark reddish brown silt loam

Subsoil:
9 to 21 inches, dark reddish brown clay

Substratum:
21 to 43 inches, dark red silt loam saprolite

Bedrock:
43 to 65 inches, weathered bedrock that crushes to silt loam

Similar inclusions in this unit are soils that have a gravelly surface layer.

Included with this soil in mapping are the somewhat excessively drained, shallow Meadows soils and the well drained, very deep Mayodan soils. Meadows soils are around the head of drainageways and at the base of the slopes. Mayodan soils are mostly around the perimeter of the unit. They formed in siltstone and sandstone residuum. Dissimilar inclusions make up about 20 percent of some mapped areas.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 40 to 60 inches
Shrink-swell potential: Low or moderate

Most areas are cultivated. Some areas are used as pasture or hayland. A few areas are wooded.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops. The surface layer is friable and can be easily tilled. The erosion potential generally is medium, but areas where the potential is low or high can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, and including grasses and legumes in the cropping system reduce the hazard of erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The depth to soft bedrock and the moderate permeability are limitations on sites for animal waste lagoons and ponds, but compacting clay in the floor of the lagoon or pond helps to overcome these limitations where the bedrock has been exposed. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine and yellow-poplar are suitable for planting.

The moderate permeability, the depth to bedrock, the shrink-swell potential, and low strength are the main limitations affecting community development. The moderate permeability and the depth to bedrock are limitations on sites for septic tank absorption fields, but these limitations generally can be overcome by installing the absorption field as shallow as possible and by increasing the size of the absorption field. The shrink-swell potential is a limitation on sites for dwellings. It can be overcome by strengthening foundations. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material.

The capability subclass is IIe.

36C—Stoneville silt loam, 7 to 15 percent slopes. This soil is deep over soft bedrock, strongly sloping, and well drained. It is on the narrow shoulders and side slopes of ridges along drainageways. Areas generally are long and narrow and range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 9 inches, dark reddish brown silt loam

Subsoil:
9 to 21 inches, dark reddish brown clay

Substratum:
21 to 43 inches, dark red silt loam saprolite

Bedrock:
43 to 65 inches, weathered bedrock that crushes to silt loam

Similar inclusions in this unit are soils that have a gravelly surface layer.

Included with this soil in mapping are the somewhat excessively drained, shallow Meadows soils and the well drained, very deep Mayodan soils. Meadows soils are around the head of drainageways and at the base of the slopes. Mayodan soils are mostly around the perimeter of the unit. They formed in siltstone and sandstone residuum. Dissimilar inclusions make up about 20 percent of some mapped areas.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 40 to 60 inches
Shrink-swell potential: Low or moderate

Most areas are cultivated. Some areas are used for pasture or hay. Some are wooded.

This soil is moderately well suited to cultivated crops. The surface layer is friable and can be easily tilled. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, and including grasses and legumes in the cropping system reduce the hazard of erosion. Growing cover crops and incorporating crop residue into the soil help to maintain the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the installation of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The moderate permeability and the depth to bedrock are limitations on sites for ponds, but compacting clay in the floor of the pond helps to overcome these limitations where the bedrock has been exposed. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface rapidly, increasing the hazards of erosion and nutrient loss.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine and yellow-poplar are suitable for planting.

The slope, the depth to bedrock, the moderate permeability, the shrink-swell potential, and low strength are the main limitations affecting community development. The moderate permeability, the depth to bedrock, and the slope are limitations on sites for septic tank absorption fields, but these limitations generally can be overcome by increasing the size of the absorption field and installing it as shallow as possible and on the contour. The slope and the shrink-swell potential are limitations on sites for dwellings. Cutting and filling are necessary to establish a level foundation. Strengthening foundations can help to overcome the shrink-swell potential. Low strength and the slope are limitations on sites for local roads and streets. Low strength can be overcome by providing suitable base material, and the slope can be overcome by cutting and filling to establish a level roadbed.

The capability subclass is IIIe.

36D—Stoneville silt loam, 15 to 25 percent slopes. This soil is deep over soft bedrock, moderately steep, and well drained. It is on the narrow side slopes of ridges along drainageways. Areas generally are long and narrow and range from about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 9 inches, dark reddish brown silt loam

Subsoil:
9 to 21 inches, dark reddish brown clay

Substratum:
21 to 43 inches, dark red silt loam saprolite

Bedrock:
43 to 65 inches, weathered bedrock that crushes to silt loam

Similar inclusions in this unit are soils that have a gravelly surface layer.

Included with this soil in mapping are the somewhat excessively drained, shallow Meadows soils and the well drained, very deep Mayodan soils. Meadows soils are around the head of drainageways and at the base of the slopes. Mayodan soils are mostly around the perimeter of the unit. They formed in siltstone and sandstone residuum. Dissimilar inclusions make up about 20 percent of some mapped areas.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 40 to 60 inches
Shrink-swell potential: Low or moderate

Most areas are cultivated. Some areas are used for pasture or hay. Some are wooded.

This soil is poorly suited to cultivated crops. The slope hinders the safe operation of most kinds of farm equipment. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, and including grasses and legumes in the cropping system reduce the hazard of erosion. Growing cover crops and incorporating crop residue into the soil help to maintain the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The slope is a limitation during construction. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

Because of the slope, this soil is generally unsuitable as a site for animal waste lagoons. The moderate permeability and the depth to bedrock are limitations on sites for ponds, but compacting clay in the floor of the pond helps to overcome these limitations where the bedrock has been exposed. Because of the slope, the water impoundment area is small in relation to the height of the dam.

This soil is moderately well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine and yellow-poplar are suitable for planting.

The slope is the main limitation affecting community development. Overcoming this limitation is especially difficult on sites for septic tank absorption fields. Even if the absorption fields are installed on the contour, lateral seepage and surfacing of the effluent in downslope areas are hazards. The slope is a limitation on sites for dwellings and for local roads and streets. Considerable cutting and filling are required to establish a level foundation or roadbed.

The capability subclass is IVe.

37B—Tatum gravelly loam, 2 to 7 percent slopes. This soil is deep over soft bedrock, gently sloping, and well drained. It is on the narrow or broad summits of ridges. Areas are irregularly shaped and range from about 6 to 100 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches, brown gravelly loam

Subsoil:
6 to 28 inches, red clay
28 to 36 inches, red silty clay loam

Substratum:
36 to 54 inches, brownish yellow and yellowish red silt loam

Bedrock:
54 to 65 inches, brownish yellow, weathered bedrock that crushes to loam

Similar inclusions in this unit are Tatum and other soils that have a subsoil that is yellower than that of this Tatum soil, are severely eroded and have a surface layer of silty clay loam, or have a nongravelly surface layer.

Included with this soil in mapping are intermingled areas of the excessively drained Goldston soils. These soils are on narrow ridgetops and side slopes between intermittent and permanent streams, in areas where bedrock is close to the surface. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 40 to 60 inches
Shrink-swell potential: Moderate

Most areas are used for cultivated crops. Some areas are used as woodland, pasture, or hayland.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops, including flue-cured tobacco. The surface layer is friable and can be easily tilled when moist. The erosion potential generally is medium, but areas where the potential is low or high can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The soil cannot be easily compacted and thus is only a fair source of embankment material. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine, yellow-poplar, and eastern white pine are suitable for planting.

The moderate permeability, low strength, the depth to bedrock, the moderate shrink-swell potential in the subsoil, and gravel-sized rock fragments in the surface layer are the main limitations affecting community development. The moderate permeability and the depth to bedrock are limitations on sites for septic tank absorption fields. The moderate permeability generally can be overcome by increasing the size of the absorption field. The shrink-swell potential is a limitation on sites for dwellings. It can be overcome by strengthening foundations. Low strength is a limitation on sites for local roads and streets. It can be overcome by providing suitable base material. The gravel-sized rock fragments in the surface layer adversely affect lawns and landscaping.

The capability subclass is IIe.

37C—Tatum gravelly loam, 7 to 15 percent slopes. This soil is deep over soft bedrock, gently sloping, and well drained. It is on the narrow foot slopes of ridges on Smith Mountain. Areas are irregularly shaped and range from about 10 to 150 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches, brown gravelly loam

Subsoil:
6 to 28 inches, red clay
28 to 36 inches, red silty clay loam

Substratum:
36 to 54 inches, brownish yellow and yellowish red silt loam

Bedrock:
54 to 65 inches, brownish yellow, weathered bedrock that crushes to loam

Similar inclusions in this unit are Tatum and other soils that have a subsoil that is yellower than that of this Tatum soil, are severely eroded and have a surface layer of silty clay loam, or have a nongravelly surface layer.

Included with this soil in mapping are intermingled areas of the excessively drained Goldston soils. These soils are on narrow ridgetops and side slopes between intermittent and permanent streams, in areas where bedrock is close to the surface. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 40 to 60 inches
Shrink-swell potential: Moderate

Most areas are used for cultivated crops. Some areas are used as woodland, pasture, or hayland.

This soil is moderately well suited to cultivated crops. The surface layer is friable and can be easily tilled when moist. The soil is highly erodible. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

The slope limits the installation of animal waste lagoons on this soil. Considerable cutting and filling are necessary to establish a level lagoon floor. The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. Mixing the soil with coarser textured material and compacting the mixture in thin layers improve the suitability for embankments. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine and Virginia pine are suitable for planting.

The slope, the moderate permeability, low strength, the depth to bedrock, the moderate shrink-swell potential in the subsoil, and gravel-sized rock fragments in the surface layer are the main limitations affecting community development. The moderate permeability, the slope, and the depth to bedrock are limitations on sites for septic tank absorption fields. The moderate permeability and the slope generally can be overcome by increasing the size of the absorption field and installing it on the contour. The slope and the shrink-swell potential are limitations on sites for dwellings. They can be overcome by cutting and filling and by strengthening foundations. The slope and low strength are limitations on sites for local roads and streets. Cutting and filling are required to establish a level

roadbed. Providing suitable base material helps to overcome low strength. The gravel-sized rock fragments in the surface layer adversely affect lawns and landscaping.

The capability subclass is IIIe.

37D—Tatum gravelly loam, 15 to 25 percent slopes. This soil is deep over soft bedrock, moderately steep, and well drained. It is on the foot slopes of ridges on Smith Mountain. Areas are long and winding and range from about 10 to 200 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches, brown gravelly loam

Subsoil:
6 to 28 inches, red clay
28 to 36 inches, red silty clay loam

Substratum:
36 to 54 inches, brownish yellow and yellowish red silt loam

Bedrock:
54 to 65 inches, brownish yellow, weathered bedrock that crushes to loam

Similar inclusions in this unit are Tatum soils that have a nongravelly surface layer or that have stones on the surface.

Included with this soil in mapping are intermingled areas of the excessively drained Goldston soils. These soils are in areas where bedrock is close to the surface. Dissimilar inclusions make up about 25 percent of some mapped areas.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 40 to 60 inches
Shrink-swell potential: Moderate

Most areas are used as woodland. A few areas are used as pasture or cropland.

This soil is poorly suited to cultivated crops. The slope hinders the safe operation of most kinds of farm equipment. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, and including grasses and legumes in the cropping system reduce the hazard of erosion. Growing cover crops and incorporating crop residue into the soil increase the content of organic matter, improve tilth, and conserve moisture.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. Erosion is a hazard during construction. It can be controlled by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

Because of the slope, this soil is generally unsuitable as a site for animal waste lagoons. The moderate permeability is a limitation on sites for ponds, but compacting the floor of the pond helps to overcome this limitation. Because of the slope, the water impoundment area is small in relation to the height of the dam.

This soil is moderately well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion. The slope hinders the safe operation of farm equipment.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine is suitable for planting. Building logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion. The slope hinders the safe operation of timber equipment.

The slope is the main limitation affecting community development. Overcoming this limitation is especially difficult on sites for septic tank absorption fields. Even if the absorption fields are installed on the contour, lateral seepage and surfacing of the effluent in downslope areas are hazards. A less sloping soil would be a better site. The slope is a limitation on sites for dwellings and

for local roads and streets. Considerable cutting and filling are required to establish a level foundation or roadbed.

The capability subclass is IVe.

37E—Tatum gravelly loam, 25 to 45 percent slopes. This soil is deep over soft bedrock, steep, and well drained. It is on the narrow side slopes of ridges along drainageways and small streams at the base of Smith Mountain. Areas generally are long and winding and range from about 10 to 180 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches, brown gravelly loam

Subsoil:
6 to 28 inches, red clay
28 to 36 inches, red silty clay loam

Substratum:
36 to 54 inches, brownish yellow and yellowish red silt loam

Bedrock:
54 to 65 inches, brownish yellow, weathered bedrock that crushes to loam

Similar inclusions in this unit are Tatum soils that are severely eroded and have a surface layer of silty clay loam, have a nongravelly surface layer, or have stones on the surface.

Included with this soil in mapping are small areas of the excessively drained Goldston soils. These soils are in areas where bedrock is close to the surface. Also included are areas of rock outcrop. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: 40 to 60 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 40 to 60 inches
Shrink-swell potential: Moderate

Most areas are used as woodland. A few small areas are used as pasture or hayland.

Because of the slope, this soil is unsuited to cultivated crops. The slope hinders the safe operation of farm equipment. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil is only moderately well suited to water-management structures. Soil conditions generally favor terraces and diversions, but the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate and the slope, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to protect the site until the plant cover has become well established.

This soil is not suitable for the construction of animal waste lagoons because of the slope. A less sloping soil would be a better site. The soil is a fair site for ponds. The moderate permeability can result in seepage and piping in the reservoir and dam. Because of the slope, the water impoundment area is small in relation to the height of the dam.

This soil is moderately well suited to pasture and hay. The main limitation is the slope, which increases the hazard of erosion and hinders the safe operation of farm equipment. Using the soil for pasture or hay helps to control erosion, but overgrazing compacts the surface layer and thus increases the runoff rate and the hazard of erosion. Proper stocking rates, rotation of livestock among pastures, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 110 cubic feet per acre. Loblolly pine is suitable for planting. Constructing logging roads and skid trails on the contour minimizes the concentration of runoff and helps to control erosion. The slope hinders the safe operation of timber equipment.

The slope is the main limitation affecting community development. Overcoming this limitation is especially difficult on sites for septic tank absorption fields. Even if the absorption fields are installed on the contour, lateral seepage and surfacing of the effluent in downslope areas are hazards. A less sloping soil would be a better site. The slope is a limitation on sites for dwellings and for local roads and streets. Considerable cutting and filling are required to establish a level foundation or roadbed.

The capability subclass is VIIe.

38A—Toccoa fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, nearly level, and well drained. It is on narrow or wide flood plains along rivers and large creeks and is occasionally flooded for brief periods, usually during winter and early spring. Areas are long and narrow and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches, dark yellowish brown fine sandy loam

Substratum:
8 to 24 inches, dark yellowish brown fine sandy loam
24 to 31 inches, dark brown fine sandy loam
31 to 36 inches, very dark grayish brown loam
36 to 45 inches, dark brown loam
45 to 65 inches, dark brown fine sandy loam

Similar inclusions in this unit are Riverview soils.

Included with this soil in mapping are the moderately well drained Chenneby soils. These soils are in slight depressions and in areas that are farthest from the streams. Dissimilar inclusions make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Strongly acid to slightly acid throughout the profile
Surface runoff: Slow
Erosion potential: Low
Depth to bedrock: More than 60 inches
Water table: Apparent at a depth of 2.5 to 5.0 feet from December through April
Root zone: More than 60 inches
Shrink-swell potential: Low
Flooding: Occasional, from December through March

Most areas are cultivated or are used as pasture. Some areas are wooded.

This soil is well suited to cultivated crops, such as corn. The surface layer is friable and can be easily tilled. Unless the soil is protected, crops are damaged by flooding on an average of once every 2 to 5 years. The soil is not highly erodible, but conservation measures are needed to control erosion and maintain productivity in some areas. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, minimize crusting, and increase the rate of water infiltration.

Terraces, diversions and grassed waterways generally are not needed on this nearly level soil. Grassed waterways are established in some areas, however, to divert surface water to an outlet.

The moderately rapid permeability, the flooding, and the seasonal high water table are limitations on sites for animal waste lagoons. A soil that is not subject to flooding would be a better site. The moderately rapid permeability is a limitation on sites for pond reservoir areas. Sealing the bottom of the pond with less permeable soil material from a nearby source or with bentonite can help to overcome this limitation. The soil is a poor source of material for embankments. It cannot be easily compacted and is subject to piping. Irrigation usually is not needed because of the natural wetness and the flooding. A drainage system generally is not needed because the high water table is not within the root zone of most cultivated crops during the growing season.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 130 cubic feet per acre. Seeds and seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Yellow-poplar and loblolly pine are suitable for planting.

The flooding and wetness are the major limitations affecting community development. They are limitations on sites for buildings and for most sanitary facilities. Dikes and levees help to protect limited areas of the soil from flooding. The construction and maintenance of these water-control structures, however, impose additional costs. As a result, buildings should be constructed on a soil that is not limited by flooding or wetness.

The capability class is I.

39—Udorthents, loamy. These soils are in areas that have been reworked by machinery. Most of the areas have been cut and filled and include borrow pits and sites for industrial, commercial, and residential buildings. Slope varies but generally is less than 8 percent.

Most of the fill material is from the soils that are adjacent to this unit. The subsoil is loamy because most of the clayey material in the subsoil has been mixed with the loamy underlying material. Many cuts extend into the underlying weathered parent material.

Included with these soils in mapping are undisturbed soils that are commonly compacted and shaped to some extent but otherwise resemble the undisturbed soils surrounding this unit. Also included are some filled areas that have old building material and other rubble in addition to the soil material.

Most areas have been stabilized and are used for building site development or recreational development. The erosion potential is very high on construction sites and in bare areas, especially the areas that have been filled. Measures that control erosion are needed. Sediment basins also are needed.

Most areas are used for structures of some type. Many are sites for schools and the adjoining recreational facilities. Some are borrow areas for nearby construction activities.

Because the characteristics of the soils vary considerably, onsite investigation is needed to determine the suitability for and limitations affecting any specific use.

No land capability classification is assigned.

40—Urban land. This unit consists of areas where more than 85 percent of the surface is covered by buildings, asphalt, concrete, or other impervious material. Examples are commercial buildings, parking lots, streets, and shopping centers. The unit generally is in the downtown business districts of the city of Danville and the towns of Chatham, Gretna, and Hurt. Areas range from about 20 to 500 acres in size. Slope ranges from 0 to 15 percent.

Included in this unit in mapping are areas of the well drained Cecil and Enott soils. These areas are between streets and sidewalks, in yards, and in traffic islands. They commonly have been disturbed. They generally are less than 500 square feet in size. Dissimilar inclusions make up less than 15 percent of the unit.

Onsite investigation is needed to determine the suitability for and limitations affecting any specific use.

No land capability classification is assigned.

41A—Wehadkee silt loam, 0 to 2 percent slopes, frequently flooded. This soil is very deep, nearly level, and poorly drained. It is on low flood plains along rivers and large creeks and is frequently flooded for brief periods from late fall to spring. Areas commonly are long and narrow and range from about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
- 0 to 1 inch, dark brown silt loam
- 1 to 6 inches, dark yellowish brown silt loam that has grayish brown mottles

Subsoil:
- 6 to 12 inches, grayish brown loam that has grayish brown mottles
- 12 to 24 inches, dark grayish brown loam that has dark gray mottles
- 24 to 31 inches, dark grayish brown loam

Substratum:
- 31 to 65 inches, dark grayish brown silt loam

Included with this soil in mapping are the well drained Riverview and Toccoa soils and the somewhat poorly drained Chenneby soils. Riverview and Toccoa soils are in the higher areas, mainly on the part of the unit that is closer to the streams. Chenneby soils are in the slightly higher areas. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Content of organic matter: Moderate
Natural fertility: Low
Soil reaction: Strongly acid to neutral throughout the profile
Surface runoff: Very slow
Erosion potential: Low
Water table: Apparent within a depth of 1 foot from December through May
Root zone: More than 60 inches
Shrink-swell potential: Low
Flooding: Frequent, from November through June

Most areas are used as woodland. A few areas are used as pasture.

Because of the frequent flooding and the seasonal high water table, this soil is generally unsuited to cultivated crops. Draining the soil is difficult in most areas because of the flooding and a lack of drainage outlets. The soil is not highly erodible, but conservation measures are needed to control erosion and maintain productivity in some areas.

Terraces, diversions, and grassed waterways generally are not needed on this nearly level soil. Grassed waterways are established in some areas, however, to divert surface water to an outlet.

The flooding and the seasonal high water table are limitations on sites for animal waste lagoons. A better drained soil that is not subject to flooding would be a

better site. The soil is suitable as a site for ponds if the reservoir area is sufficient. Seepage is a hazard during dry periods because of the moderate permeability. The soil is a poor source of material for embankments because the high water table limits the ease of excavation. Irrigation is not needed because of the natural wetness and the flooding. The soil generally can be drained, but drainage outlets are not available in some areas and floodwater sometimes temporarily rises above the outlet.

This soil generally is moderately well suited to pasture and hay, but alfalfa is short lived because of seasonal wetness. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, a drainage system, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and damage stands of grasses and legumes.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 135 cubic feet per acre. Seasonal wetness causes a high rate of seedling mortality. The soil is soft when wet. As a result, the use of heavy timber equipment is limited to extended dry periods during summer.

The flooding and the seasonal high water table are the major limitations affecting community development. They are limitations on sites for buildings and for most sanitary facilities. The soil dries out slowly in spring and after heavy rains. In many areas it stays wet and muddy throughout the year. Dikes and levees help to protect limited areas of the soil from flooding, and open-ditch or subsurface drainage systems help to overcome wetness. The construction and maintenance of these water-control structures, however, impose additional costs. As a result, buildings should be constructed on a soil that is not limited by flooding or wetness.

The capability subclass is VIw.

42B—Wickham sandy loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on terraces along streams. Areas are irregularly shaped and range from about 6 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
- 0 to 9 inches, dark yellowish brown sandy loam

Subsoil:
- 9 to 20 inches, strong brown clay loam that has dark yellowish brown mottles
- 20 to 28 inches, yellowish red clay loam
- 28 to 36 inches, yellowish red clay loam that has yellowish brown mottles
- 36 to 43 inches, yellowish red sandy clay loam that has yellowish brown mottles

Substratum:
- 43 to 65 inches, strong brown gravelly sandy clay loam that has red mottles

Similar inclusions in this unit are State soils and Wickham soils that have a gravelly surface layer.

Included with this soil in mapping are intermingled areas of the well drained Hiwassee and Cecil soils. These soils are higher on the landscape than the Wickham soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Content of organic matter: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Erosion potential: Medium
Depth to bedrock: More than 60 inches
Water table: At a depth of more than 72 inches
Root zone: More than 60 inches
Shrink-swell potential: Low

Most areas are used for cultivated crops. Some areas are used as woodland, pasture, or hayland.

This soil meets the requirements for prime farmland. It is well suited to cultivated crops, including flue-cured tobacco. The surface layer is very friable and can be easily tilled when moist. The erosion potential generally is medium, but areas where the potential is low or high can occur because the gradient and length of the slopes vary. Some areas require extensive conservation measures. Applying a system of conservation tillage, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is suitable as a site for water-management structures, including terraces, diversions, and grassed waterways. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of straw or hay as barriers help to

protect the site until the plant cover has become well established.

The moderate permeability is a limitation on sites for animal waste lagoons and ponds, but compacting the floor of the lagoon or pond helps to overcome this limitation. The supply of water on the ridges is insufficient to keep a pond full in most areas. The rate at which irrigation water is applied should be monitored carefully because the slope of the soil allows excess water to run off the surface, increasing the hazards of nutrient loss and erosion.

This soil is well suited to pasture and hay. Measures that establish and maintain a mixture of grasses and legumes, proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is very high. The estimated annual production of wood is 130 cubic feet per acre. Seedlings survive and grow well if competing vegetation is controlled by proper site preparation, such as prescribed burning. Loblolly pine is suitable for planting.

Few limitations affect community development. The moderate permeability is a limitation on sites for septic tank absorption fields, but it can be overcome by enlarging the absorption field.

The capability subclass is IIe.

43C—Wilkes gravelly fine sandy loam, 7 to 15 percent slopes. This soil is shallow over soft bedrock, strongly sloping, and well drained. It is on the nose slopes of ridges and on side slopes bordering small drainageways. Areas generally are irregularly shaped and range from about 5 to 15 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches, dark grayish brown gravelly fine sandy loam

Subsoil:
8 to 13 inches, strong brown sandy clay loam

Bedrock:
13 to 48 inches, partially weathered bedrock that crushes to sandy loam
48 inches, hard bedrock

Similar inclusions in this unit are Wilkes soils that have slopes of less than 7 percent.

Included with this soil in mapping are the well drained Cullen, Poindexter, and Enott soils. These soils are in scattered areas throughout the unit. They are deeper over bedrock than the Wilkes soil. Dissimilar inclusions make up about 20 percent of the unit.

Important soil properties—

Permeability: Moderately slow or moderate
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: High
Soil reaction: Strongly acid to slightly acid in the upper part of the profile and moderately acid to neutral in the lower part
Surface runoff: Rapid
Erosion potential: High
Depth to bedrock: 10 to 20 inches to soft bedrock
Water table: At a depth of more than 72 inches
Root zone: Restricted by the soft bedrock at a depth of 10 to 20 inches
Shrink-swell potential: Moderate

Most areas are wooded. A small acreage is used for pasture or hay or for cultivated crops.

This soil is poorly suited to cultivated crops. The surface layer is very friable, and tilth is fair. When plowed, however, the surface layer tends to become gravelly because of the shallowness to bedrock. The soil is droughty during the growing season. The response of crops to applications of lime and fertilizer generally is limited by the very low available water capacity. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity. Applying a system of conservation tillage, stripcropping, growing cover crops, including grasses and legumes in the cropping system, and incorporating crop residue into the soil help to maintain the content of organic matter and tilth, control erosion, minimize crusting, and increase the rate of water infiltration.

This soil generally is not well suited to water-management structures. The bedrock underlying the soil interferes with the construction of some terraces and diversions. Because of the runoff rate and droughtiness, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a

better site for lagoons. The soil is poorly suited to ponds. The shallowness to bedrock can result in seepage in the reservoir area and around the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is moderately well suited to pasture and hay. Because of droughtiness, establishing or maintaining high-quality forage is difficult. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. The trees that are suitable for planting include loblolly pine and Virginia pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation.

The slope, the depth to bedrock, and the shrink-swell potential are the main limitations affecting community development. The slope and the depth to bedrock are limitations on sites for septic tank absorption fields and excavations. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. The shrink-swell potential is a limitation on sites for dwellings. It can be overcome by strengthening foundations. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs.

The capability subclass is VIs.

43D—Wilkes gravelly fine sandy loam, 15 to 25 percent slopes. This soil is shallow over soft bedrock, moderately steep and steep, and well drained. It is on the nose slopes of ridges and on side slopes bordering small drainageways. Areas generally are irregularly shaped and range from about 5 to 15 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches, dark grayish brown gravelly fine sandy loam

Subsoil:
8 to 13 inches, strong brown sandy clay loam

Bedrock:
13 to 48 inches, partially weathered bedrock that crushes to sandy loam
48 inches, hard bedrock

Included with this soil in mapping are the well drained Enott and Poindexter soils. These soils are in scattered areas throughout the unit. They are deeper over bedrock than the Wilkes soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately slow or moderate
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: High
Soil reaction: Strongly acid to slightly acid in the upper part of the profile and moderately acid to neutral in the lower part
Surface runoff: Rapid
Erosion potential: High
Water table: At a depth of more than 72 inches
Depth to bedrock: 10 to 20 inches to soft bedrock
Root zone: Restricted by the soft bedrock at a depth of 10 to 20 inches
Shrink-swell potential: Moderate

Most areas are wooded. A small acreage is used for pasture or hay.

Because of the slope, this soil is generally unsuited to cultivated crops. The slope hinders the safe operation of farm equipment. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil generally is not well suited to water-management structures. The bedrock underlying the soil interferes with the construction of some terraces and diversions, and the slope hinders the safe operation of construction equipment. Because of the very rapid runoff rate and droughtiness, establishing grassed waterways is difficult. The hazard of erosion can be reduced during construction by adding barriers, such as bales of straw or hay and silt fences. After construction has been completed, grading, applying lime and fertilizer, and seeding to establish a permanent plant cover can protect the site from erosion. Straw mulch, fiber mats, and bales of hay or straw as barriers help to protect the site until the plant cover has become well established.

The depth to bedrock and the slope are the major limitations affecting the construction of animal waste lagoons. A soil that is deeper over bedrock would be a better site for lagoons. The soil is poorly suited to ponds. The shallowness to bedrock can result in seepage in the reservoir area and around the dam. Because of the slope, the pond reservoir area is small in relation to the height of the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is moderately well suited to pasture and hay. Because of droughtiness, establishing or

maintaining high-quality forage is difficult. The slope hinders the safe operation of farm equipment. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. The trees that are suitable for planting include loblolly pine and Virginia pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The slope limits the use of equipment and results in a hazard of erosion, particularly in areas that are disturbed during harvesting activities.

The slope and the depth to bedrock are the main limitations affecting community development. They are limitations on sites for septic tank absorption fields and excavations and for most types of buildings. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs.

The capability subclass is VIe.

43E—Wilkes gravelly fine sandy loam, 25 to 50 percent slopes. This soil is shallow over soft bedrock, steep, and well drained. It is on the sides of ridges bordering small drainageways. Areas generally are irregularly shaped and range from about 5 to 15 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches, dark grayish brown gravelly fine sandy loam

Subsoil:
8 to 13 inches, strong brown sandy clay loam

Bedrock:
13 to 48 inches, partially weathered bedrock that crushes to sandy loam
48 inches, hard bedrock

Included with this soil in mapping are the well drained Enott and Poindexter soils. These soils generally are in the less steep areas. They are deeper over bedrock than the Wilkes soil. Dissimilar inclusions make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderately slow or moderate
Available water capacity: Very low
Content of organic matter: Low
Natural fertility: High
Soil reaction: Strongly acid to slightly acid in the upper part of the profile and moderately acid to neutral in the lower part
Surface runoff: Very rapid
Erosion potential: High
Depth to bedrock: 10 to 20 inches to soft bedrock
Root zone: Restricted by the soft bedrock at a depth of 10 to 20 inches
Shrink-swell potential: Moderate

Most areas are wooded. A small acreage is used as pasture.

Because of the slope, this soil is unsuited to cultivated crops. The slope hinders the safe operation of farm equipment. The soil is highly erodible. Extensive conservation measures are necessary to control erosion and maintain productivity.

This soil generally is not well suited to water-management structures. The bedrock underlying the soil interferes with the construction of grassed waterways, terraces, and diversions, and the slope hinders the safe operation of construction equipment.

This soil is not suitable for the construction of animal waste lagoons because of the slope and the depth to bedrock. A less sloping soil that is deeper over bedrock would be a better site. The soil is poorly suited to ponds. The shallowness to bedrock can result in seepage in the reservoir area and around the dam. Because of the slope, the pond reservoir area is small in relation to the height of the dam. A soil that is deeper over bedrock would be a better site for ponds.

This soil is poorly suited to pasture and hay. Because of droughtiness, establishing or maintaining high-quality forage is difficult. The slope hinders the safe operation of farm equipment. Proper stocking rates, rotation of livestock among pastures, timely deferment of grazing, and applications of lime and fertilizer help to establish a good plant cover and increase the carrying capacity of the pastures. Overgrazing causes compaction of the surface layer and thus increases the runoff rate and the hazard of erosion.

The potential productivity of this soil for loblolly pine is high. The estimated annual production of wood is 100 cubic feet per acre. The trees that are suitable for planting include loblolly pine and Virginia pine. Drum chopping, clearing, cutting, and girdling help to control competing vegetation. The slope limits the use of equipment and results in a hazard of erosion,

particularly in areas that are disturbed during harvesting activities.

The slope and the depth to bedrock are the main limitations affecting community development. They are limitations on sites for septic tank absorption fields and excavations and for most types of buildings. A method of sewage disposal that does not require a deep soil should be selected. Otherwise, a soil that is less steep and is deeper over bedrock should be considered. Heavy equipment and explosives can be used during building site excavation or road construction, but they add to construction costs.

The capability subclass is VIIe.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 7 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 112,050 acres in the survey area, or more than 17 percent of the total acreage, meets the soil requirements for prime farmland.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

G. Russell Vaughan, Jr., district conservationist, Soil Conservation Service, prepared this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

More than 136,000 acres in the survey area is used for the production of crops or hay. Of this total, approximately 66,000 acres is used for row crops (flue-cured tobacco, dark tobacco, corn, and soybeans), 24,000 acres for close-grown crops (wheat, oats, barley, and rye), and 22,000 acres for permanent hayland, which supports alfalfa, grasses, or a grass-legume mixture. Pasture makes up more than 85,000 acres of the farmland in the survey area. About 22,000 acres is idle or fallow land, and 1,000 acres is used for miscellaneous purposes, such as gardens and wildlife habitat. Grain sorghum, cotton, and peanuts can be grown on some of the soils in the survey area.

The acreage of cropland in the survey area generally has remained constant during the past 10 years. Only a small acreage of the cropland has been converted to nonagricultural uses. During the past 5 years, the production of soybeans has significantly increased and there has been a renewed interest in alfalfa as a cash crop. The acreage used for alfalfa for forage probably will continue to increase.

Specialty crops are grown on a small acreage in the survey area. They include assorted vegetables, apples, peaches, strawberries, and nursery plants. Most are produced by pick-your-own enterprises. Broccoli has become an alternative cash crop in recent years. Most of the broccoli grown in the survey area is marketed through a local cooperative to retail stores in the immediate area. The very deep, well drained Appling, Cecil, Cullen, and Mayodan soils are especially well suited to most of the specialty crops. Most of the well

drained soils on uplands are suitable for orchards and nursery plants. Soils in low areas, where frost is frequent and air drainage is poor, generally are poorly suited to early vegetables, small fruits, and orchards.

The main management needs on the cropland in the survey area are measures that control erosion and improve fertility and tilth.

Erosion is the major management concern on most of the cropland in the survey area. Most of the soils have slopes of more than 7 percent and thus are susceptible to erosion. Loss of the surface layer through erosion reduces the productivity, fertility, and available water capacity of the soil. Erosion is especially damaging on soils that have a clayey subsoil, such as Appling, Cecil, Cullen, and Mayodan soils, and on soils that have bedrock near the surface. It also reduces the productivity of soils that tend to be droughty, such as Ashlar and Pinkston soils.

Erosion results in the sedimentation of streams. Measures that control erosion can minimize this pollution and improve the quality of water for municipal use, for recreation, and for fish and wildlife.

Preparing a good seedbed through conventional tillage is difficult on severely eroded soils because much of the clayey subsoil is exposed. A surface layer containing excessive amounts of clay is characterized by an extremely low content of organic matter and a restricted rate of water infiltration. Exacting levels of moisture are needed during tillage to prevent cloddiness and compaction. Establishing a good stand of most crops is difficult on eroded soils because germination is restricted by a reduced amount of available moisture in the seedbed and the tendency of the surface to bake and crust over. A severely eroded surface layer is common in areas of Cecil and Cullen soils. It generally is less common in areas of Appling and Mayodan soils.

Management practices that provide a protective cover help to control runoff and increase the rate of water infiltration. A cropping system that keeps a plant cover on the soil for extended periods can hold erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which generally require temporary pasture and hay, including forage crops of grasses and legumes in the cropping system helps to control erosion, provides nitrogen, and improves tilth for the next crop in the system.

Stripcropping, terraces, contour farming, and grassed waterways are the most common erosion-control measures in the survey area. They are best suited to soils that have broad, uniform slopes. Terraces and diversions reduce the length of slopes and thus help to control runoff and erosion. They are most practical on very deep, well drained soils that have long slopes of 2 to 10 percent. Appling, Cecil, Cullen, and Mayodan soils are examples of soils that are suitable for terraces. Terracing is normally not practical on Pacolet, Poindexter, Madison, and Rion soils because of the depth to bedrock, the slope, or both. A combination of stripcropping or contour farming and a long-term rotation that includes 2 or more years of a protective plant cover is required to control erosion on these soils. Using the soils as permanent pasture or hayland also can be effective in controlling erosion.

No-till farming, minimum tillage, crop residue management, and winter cover crops increase the rate of water infiltration and reduce the hazards of runoff and erosion. They are suitable on most of the soils in the survey area, but they are less effective on the more eroded soils. Conservation tillage, which includes no-till farming and minimum tillage, is becoming more common in the survey area. It is a cost-effective practice that helps to control erosion on the more sloping soils. It can be used on most of the soils in the survey area.

Natural fertility is low in most of the soils used for crops in the survey area. Most of the soils are very strongly acid or strongly acid unless lime has been applied. Applying the amount of lime needed to obtain the proper pH level enables crops to use fertilizer and soil moisture more efficiently. The proper pH level also is needed if herbicides are to be effective in controlling grasses and broadleaf weeds. On most of the soils in the survey area, crops respond well to applications of lime and fertilizer, which should be based on the results of soil tests.

Soil tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Soils with good tilth are granular and porous.

Most of the soils used for crops in the survey area have a surface layer of sandy clay loam that is low in content of organic matter. Generally, the structure of such soils is weak. A crust forms on the surface during periods of rainfall. The crust is hard when dry. As a result, it reduces the rate of water infiltration and increases the runoff rate. Regular additions of crop residue and other organic material through proper crop rotations improve soil structure and minimize crusting. Deterioration of tilth is a management concern in areas of the severely eroded Cecil and Cullen soils.

Pastures in the survey area commonly support tall fescue, bluegrass, and orchardgrass, with or without white clover. Most improved pastures are seeded to mixtures of tall fescue and ladino clover. Pastures of cool-season plants provide most of the forage in spring and autumn. Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are the major concerns in managing the pastures. Proper stocking rates, rotation of livestock among pastures,

weed control, deferred grazing during wet periods on the moderately well drained and poorly drained soils, and applications of lime and fertilizer are the major management practices. Stockpiling tall fescue in the fall for winter grazing can reduce the need for hay.

The major plants grown for hay are Kentucky-31 fescue, orchardgrass, and red clover. Many of the soils in the survey area suitable for alfalfa if the proper amounts of lime and fertilizer are applied.

Bright Leaf Tobacco

Flue-cured tobacco has more specific soil requirements than the other row crops commonly grown in the survey area. Very deep, well drained soils that have a relatively thick surface layer of sandy loam, such as Appling and Mayodan soils, are better suited to flue-cured tobacco than other soils in the survey area. The coarser textured soils generally allow greater flexibility in controlling nitrogen utilization, which is very important in developing a quality product. Too little or too much nitrogen can have a very adverse effect on quality. The coarser textured soils permit the controlled removal of nitrogen from the upper part of the profile through rainfall, irrigation, or both. They are basically acidic. The acidity is desirable trait for tobacco production, which requires a pH level of 5.5 to 6.0. This level can be easily controlled by applications of lime.

Fine textured soils, which have a high content of clay in the surface layer, such as Cecil and Pacolet soils, also are used for tobacco, but the quality of the crop normally is not so good because a higher level of management is needed to achieve the proper degree of nitrogen utilization. If all management factors are equal, higher yields are not unusual on these fine textured soils.

Extreme caution is needed on soils that are characterized by restricted internal drainage, such as Enott, Creedmoor, and Mattaponi soils, because tobacco is very sensitive to abnormally wet conditions in the root zone. A relatively wet condition can cause the plant to drown, wilt, and deteriorate rapidly.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce

the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

James F. Wagner, area forester, Soil Conservation Service, prepared this section.

As in most of Virginia, virgin forests covered almost all of the survey area when the first settlers arrived. Most of the timber was eventually cut, and the land that was suitable for cultivation was cleared. As time passed and the land lost its productivity, farmers moved on and much of the abandoned farmland eventually reverted to timber. Many of the current pine stands resulted from this reversion process.

In 1985, approximately 400,638 acres in the survey area, or nearly 62 percent of the total land area, was woodland. Of this total, 339,300 acres was managed by nonindustrial private landowners, 58,254 acres by the forest industry, and 3,084 acres by county, municipal, and State governments. The woodland is well distributed throughout the survey area.

Species composition is very diverse and can generally be grouped into upland hardwoods, pine, and bottom-land hardwoods. The upland hardwoods group makes up 63 percent of the woodland. It includes white oak, red oak, scarlet oak, hickory, chestnut oak, and associated species. The pine group makes up about 25 percent of the woodland. It includes Virginia pine, shortleaf pine, and loblolly pine. The bottom-land hardwoods group makes up about 12 percent of the woodland. It includes yellow-poplar, river birch, sycamore, red maple, willow oak, sweetgum, and associated species.

The woodland in the survey area can produce quality timber if proper management is applied. Reforesting cutover areas and planting trees on marginal pasture and cropland help to maintain an adequate supply of timber for future generations. Improving the existing stands by thinning helps to ensure quality timber and maintain productivity. Erosion and sedimentation are serious problems in areas that are disturbed by logging activities. The Virginia Department of Forestry can help to determine specific woodland management needs.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will

occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class.* The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class* is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Recreation

This survey area has many recreational areas. Hunting, camping, hiking, fishing, and water sports are among the major recreational activities. Public areas, such as Smith Mountain and Leesville Lakes, and private areas, such as Lake Burton, Elkhorn Park, and Cherrystone Park, provide excellent opportunities for a wide variety of recreational activities. Recreation centers are in Brosville, Chatham, Greenfield, Gretna, Hurt, and Laurel Grove.

Recreation has become significantly more important in the survey area since the development of Smith Mountain and Leesville Lakes. Many soils are well suited to the development of recreational facilities. Some of the best suited soils are Appling sandy loam, 2 to 7 percent slopes; Cecil sandy loam, 2 to 7 percent slopes; and Mayodan fine sandy loam, 2 to 7 percent slopes. These soils are very deep, well drained, and moderately permeable.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of

the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

This survey area has an extensive and varied population of fish and wildlife. White-tailed deer, raccoon, squirrel, and fox inhabit forested areas, and opossum, rabbits, and woodchucks inhabit open fields and farmed areas where they can find food and cover. Game birds, such as wild turkey, bobwhite quail, and mourning dove, are abundant throughout the survey area. Smith Mountain and Leesville Lakes provide habitat for largemouth bass, bluegill, and pike. Channel catfish are the dominant fish in the many rivers and streams in the survey area. Because of their protected wildlife management areas and limited hunting seasons, White Oak Mountain and Smith Mountain provide sanctuary for a variety of wildlife species.

Many of the soils in the survey area are well suited to wildlife habitat. Deep, well drained soils on uplands provide good habitat for openland and woodland wildlife. Examples are Appling sandy loam, 2 to 7 percent slopes; Appling sandy loam, 7 to 15 percent slopes; Cecil sandy loam, 2 to 7 percent slopes; Cecil sandy loam, 7 to 15 percent slopes; Mayodan fine sandy loam, 2 to 7 percent slopes; and Mayodan fine sandy loam, 7 to 15 percent slopes.

The areas of narrow bottom land along many of the smaller rivers and streams in the survey area provide suitable habitat for wetland wildlife, such as beaver and muskrat. The most common soils in these areas are Chenneby loam, 0 to 2 percent slopes, occasionally flooded; Chenneby-Toccoa complex, 0 to 2 percent slopes, frequently flooded; and Wehadkee silt loam, 0 to 2 percent slopes, frequently flooded.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or

by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a

cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and ills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of

landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of

grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil

to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16. Only saturated zones within a depth of about 6 feet are indicated.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is

allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(7)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, thermic Typic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(6)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(7)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Appling Series

Soils of the Appling series are very deep and well drained. They formed in residuum of granite or granite

gneiss. They are on uplands. Slope ranges from 2 to 15 percent.

Appling soils generally are near Ashlar, Cecil, Enott, Helena, Mattaponi, Pacolet, Rion, and Wilkes soils. Appling soils have a solum that is thicker than that of Ashlar, Enott, Rion, and Wilkes soils and have more clay in the subsoil than Ashlar and Rion soils. They are browner in the subsoil than Cecil and Pacolet soils. They do not have gray mottles in the subsoil, unlike Helena and Mattaponi soils.

Typical pedon of Appling sandy loam, 2 to 7 percent slopes, 814 yards east-southeast of the intersection of Virginia Highways 726 and 730 and 396 yards south of Virginia Highway 730, in a cultivated field:

Ap—0 to 7 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; common fine roots; common medium vertical tubular and few coarse irregular pores; about 2 percent angular quartz gravel; very strongly acid; abrupt smooth boundary.

Bt1—7 to 11 inches; yellowish brown (10YR 5/6) sandy clay loam; common fine distinct light yellowish brown (10YR 6/4) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; common medium vertical tubular and few coarse irregular pores; few faint clay films on faces of peds; few fine flakes of mica; strongly acid; abrupt smooth boundary.

Bt2—11 to 26 inches; strong brown (7.5YR 5/6) clay; many fine distinct red (2.5YR 4/6) mottles; moderate fine subangular blocky structure; firm, sticky and plastic; common fine roots; few fine oblique tubular pores; common distinct clay films on faces of peds; about 2 percent soft fine feldspar gravel; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—26 to 34 inches; yellowish brown (10YR 5/8) sandy clay; red (2.5YR 4/6) bands; moderate fine angular blocky structure; firm, sticky and plastic; few fine roots; common fine oblique tubular pores; common distinct clay films on faces of peds; about 5 percent soft fine feldspar gravel; common fine flakes of mica; very strongly acid; clear smooth boundary.

Bt4—34 to 45 inches; yellowish red (5YR 5/8) sandy clay loam; common fine faint red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few medium and common fine irregular pores; few faint clay films on faces of peds; about 5 percent soft fine feldspar gravel; common fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—45 to 65 inches; yellowish red (5YR 5/6), strong brown (7.5YR 5/8), and yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; very friable, slightly sticky and nonplastic; few fine roots; few medium and common fine irregular pores; few thin clay flows; about 5 percent soft fine feldspar gravel; common fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The Bt horizon ranges from 18 to 40 inches in thickness and extends to a depth of 30 to 60 inches. The depth to bedrock is more than 72 inches. Rock fragments of mostly angular quartz gravel make up 0 to 15 percent of the A, BA, and E horizons and 0 to 5 percent of the Bt horizon. In unlimed areas reaction is very strongly acid or strongly acid.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 3 to 6. The E horizon, if it occurs, has hue of 10YR or 2.5Y and value and chroma of 4 to 6. It is sandy loam or loamy sand.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8. Subhorizons that have hue of 5YR are mottled. This horizon is dominantly clay, sandy clay, or clay loam but has thin layers of sandy clay loam.

The BC horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8. It is clay loam or sandy clay loam.

Ashlar Series

Soils of the Ashlar series are moderately deep and excessively drained. They formed in residuum of granite and granite gneiss. They are on uplands. Slope ranges from 7 to 50 percent.

Ashlar soils generally are near Appling, Cecil, Pacolet, and Rion soils. Ashlar soils have less clay in the subsoil than the nearby soils and have a solum that is thinner than that of Appling and Cecil soils.

Typical pedon of Ashlar fine sandy loam, 15 to 35 percent slopes, 10 miles south of Chatham and 930 yards south of the intersection of Virginia Highways 726 and 716, in an area of woodland:

Oi—1 inch to 0; loose leaves, twigs, and partially decomposed organic matter.

A—0 to 2 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many fine and common medium roots; common fine tubular pores; very strongly acid; abrupt smooth boundary.

Bw1—2 to 7 inches; yellowish brown (10YR 5/8) fine sandy loam; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; common

fine and few medium roots; common fine tubular pores; very strongly acid; clear smooth boundary.

Bw2—7 to 16 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common fine and few medium roots; many very fine tubular pores; about 10 percent gravel-sized weathered rock fragments; very strongly acid; clear smooth boundary.

C—16 to 22 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; firm in place, friable when dug; few fine and medium roots; few thin yellowish red (5YR 5/6) clay flows on cleavage faces; very strongly acid; abrupt wavy boundary.

Cr—22 to 30 inches; weathered, multicolored bedrock that crushes to fine sandy loam.

R—30 inches; hard, fine grained crystalline bedrock.

The thickness of the solum ranges from 14 to 30 inches. The depth to hard bedrock ranges from 20 to 40 inches. Gravel-sized fragments of quartz, granite, and other acid crystalline rocks make up 0 to 15 percent of the A and Bw horizons and 0 to 35 percent of the C horizon. In unlimed areas reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4.

The Bw horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam or fine sandy loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 to 8, and chroma of 1 to 8. In the fine-earth fraction, it is coarse sandy loam, sandy loam, or fine sandy loam.

The Cr horizon is weathered bedrock that crushes to sandy loam or fine sandy loam. It has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 8.

Bolling Series

Soils of the Bolling series are very deep and moderately well drained. They formed in alluvium on low stream terraces. Slope ranges from 0 to 7 percent.

Bolling soils generally are near Chenneby, State, Wehadkee, and Wickham soils. Bolling soils have more clay in the subsoil than the nearby soils. They are grayer in the subsoil than State and Wickham soils and less gray in the subsoil than Wehadkee soils.

Typical pedon of Bolling fine sandy loam, 2 to 7 percent slopes, 270 yards southeast of the intersection of Virginia Highways 863 and 880 and 75 yards northeast of Virginia Highway 880, in an area of woodland:

A—0 to 5 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many fine and common medium roots; many fine and very fine tubular pores; very strongly acid; abrupt wavy boundary.

E—5 to 9 inches; light yellowish brown (10YR 6/4) fine sandy loam; common medium distinct brown (10YR 5/3) mottles; weak medium granular structure; very friable, nonsticky and nonplastic; common fine and few medium roots; many fine tubular pores; about 2 percent manganese concretions less than one-quarter inch in diameter; strongly acid; abrupt wavy boundary.

Bt1—9 to 15 inches; light yellowish brown (10YR 6/4) clay loam; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly sticky and slightly plastic; common medium and few fine roots; many fine tubular pores; many distinct light yellowish brown (10YR 6/4) sand coatings on prism faces as much as one-quarter inch thick, neutral; clear wavy boundary.

Bt2—15 to 32 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent light gray (10YR 7/1) and common fine faint yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm, sticky and very plastic; few fine roots; few fine tubular pores; many distinct brownish yellow (10YR 6/6) sand coatings on prism faces as much as one-quarter inch thick; moderately alkaline; gradual wavy boundary.

Bt3—32 to 53 inches; variegated light gray (10YR 6/1), pale brown (10YR 6/3), and yellowish brown (10YR 5/8) clay loam; weak thick platy structure parting to weak fine subangular blocky; firm, slightly sticky and plastic; few fine roots; few fine tubular pores; many distinct pale brown (10YR 6/3) clay films on faces of peds; irregularly shaped pocket of strong brown and black fine sandy loam about 5 inches in diameter; moderately alkaline; gradual wavy boundary.

C—53 to 65 inches; light brown (7.5YR 6/4) sandy clay loam; common medium prominent yellowish brown (10YR 5/6) and light gray (10YR 7/2) mottles; massive; friable, slightly sticky and slightly plastic; few fine roots; common fine irregular pores; few rounded quartz pebbles less than one-quarter inch in diameter; moderately alkaline.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock is more than 60 inches. Fragments of mostly rounded quartz make up 0 to 15 percent of the A and E horizons and 0 to 5 percent of the Bt and C horizons. Reaction is very

strongly acid to neutral in the A and E horizons and in the upper part of the Bt horizon and moderately acid to moderately alkaline in the lower part of the Bt horizon and in the C horizon.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is mottled in shades of red, brown, yellow, or gray. It is sandy clay loam or clay loam.

The Btg horizon, if it occurs, has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 3. It is mottled in shades of red, brown, or yellow. It is sandy clay loam, clay loam, or clay.

The BC horizon, if it occurs, generally has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 8. In some pedons it is mottled and does not have a dominant matrix color. It is sandy loam to sandy clay.

The C horizon has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 8. It typically is stratified and is loamy sand to sandy clay loam.

Cecil Series

Soils of the Cecil series are very deep and well drained. They formed in residuum of granite, granite gneiss, mica schist, and mica gneiss. They are on uplands. Slope ranges from 2 to 15 percent.

Cecil soils generally are near Appling, Ashlar, Cullen, Enott, Hiwassee, Madison, Mattaponi, Pacolet, Rion, and Wilkes soils. Cecil soils have a redder hue in the subsoil than Appling and Mattaponi soils and have more clay than Ashlar soils. They do not have dark streaks or concretions in the subsoil, unlike Cullen soils. They have a solum that is thicker than that of Enott, Pacolet, Rion, and Wilkes soils; have yellower hue than Hiwassee soils; and have less mica in the subsoil than Madison soils.

Typical pedon of Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded, 924 yards northwest of the intersection of Virginia Highways 41 and 743 and 528 yards west of Virginia Highway 41, in a fallow field:

Ap—0 to 8 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium granular structure; friable, slightly sticky and slightly plastic; common fine and very fine roots; common very fine tubular pores; few fine flakes of mica; strongly acid; clear wavy boundary.

Bt1—8 to 19 inches; red (2.5YR 4/6) clay; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine and very fine subangular blocky structure; firm, sticky and plastic; common very fine roots; common fine tubular and few irregular pores; many faint clay films on faces of peds; few fine flakes of mica; strongly acid; diffuse wavy boundary.

Bt2—19 to 34 inches; red (2.5YR 4/6) clay; moderate fine subangular blocky structure; firm, sticky and plastic; common very fine roots; common fine tubular pores; many faint clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt3—34 to 59 inches; red (2.5YR 4/6) clay loam; weak fine and medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; common fine irregular pores; common faint clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C—59 to 65 inches; red (2.5YR 5/8) and reddish yellow (7.5YR 6/8) loam saprolite; massive; very friable, slightly sticky and slightly plastic; common very fine irregular pores; common fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The clayey Bt horizon ranges from 24 to 48 inches in thickness and extends to a depth of 30 to 60 inches. The depth to hard bedrock is more than 78 inches. Gravel-sized hard rock fragments make up 0 to 15 percent of the Ap and E horizons and 0 to 10 percent of the Bt and C horizons. The Ap and E horizons and the upper part of the Bt horizon have few or common flakes of mica, and the lower part of the Bt horizon and the C horizon have few to many flakes of mica. In unlimed areas reaction is very strongly acid or strongly acid throughout the profile.

The Ap horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 2 to 6. It is sandy loam in the less eroded areas and sandy clay loam in severely eroded areas.

Some pedons have an E horizon. This horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. Hue of 5YR is limited to thin transitional layers or to pedons that do not have mottles in the lower part of the horizon. This horizon clay or clay loam.

The C horizon is multicolored loam or sandy clay loam saprolite.

Chenneby Series

Soils of the Chenneby series are very deep and somewhat poorly drained. They formed in alluvium on flood plains. Slope ranges from 0 to 2 percent.

Chenneby soils generally are near Bolling, Riverview, State, Toccoa, and Wehadkee soils and are mapped in complex with Toccoa soils. Chenneby soils have less clay in the subsoil than Bolling soils. They have grayish mottles in the upper part of the subsoil, unlike Riverview and State soils. They have more clay in the subsoil than Toccoa soils and are less gray in the subsoil than Wehadkee soils.

Typical pedon of Chenneby loam, 0 to 2 percent slopes, occasionally flooded, 300 yards east of the Dan River and 1,800 yards west-northwest of the intersection of Ferry Road (Virginia Highway 1142) and Virginia Highway 1132, in a cultivated field:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) loam; weak fine granular structure; very friable, nonsticky and slightly plastic; common fine and very fine roots; common fine tubular pores; common fine flakes of mica; moderately acid; abrupt smooth boundary.

Bw1—6 to 12 inches; dark yellowish brown (10YR 4/4) loam; common fine prominent reddish brown (2.5YR 4/4) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine roots; common fine irregular pores; few soft dark fine concretions; common fine flakes of mica; moderately acid; clear smooth boundary.

Bw2—12 to 18 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct brown (7.5YR 4/4) and few fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine roots; common fine tubular pores; common soft dark fine concretions; common fine flakes of mica; strongly acid; clear smooth boundary.

Bw3—18 to 23 inches; brown (10YR 4/3) silty clay loam; common fine distinct brown (7.5YR 4/4) and common fine faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; common faint silt coatings in root channels; few soft dark fine concretions; common fine flakes of mica; strongly acid; abrupt smooth boundary.

Bw4—23 to 30 inches; mottled strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) silty clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few very fine roots; common very fine and few fine tubular pores; common distinct silt coatings on faces of peds and in root channels; few hard dark fine concretions; common fine flakes of mica; strongly acid; clear smooth boundary.

Bg1—30 to 37 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; common faint silt coatings in root channels and on faces of peds; many soft dark fine concretions; common fine flakes of mica; strongly acid; clear smooth boundary.

Bg2—37 to 65 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and strong brown (7.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular and common fine vesicular pores; few faint silt coatings in root channels and pores; common soft dark fine concretions; common fine flakes of mica; strongly acid.

The thickness of the solum ranges from 40 to 70 inches. The depth to hard bedrock is more than 72 inches. Few or common fine flakes of mica are throughout the profile. In unlimed areas reaction ranges from very strongly acid to moderately acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is loam, silt loam, clay loam, or silty clay loam. Loam and clay loam are limited to thin subhorizons.

The Bg horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2, or it is mottled and does not have a dominant matrix color. It is loam, silt loam, clay loam, or silty clay loam.

Some pedons have a Cg horizon. This horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is silty clay loam to sandy loam.

Creedmoor Series

Soils of the Creedmoor series are very deep and moderately well drained. They formed in siltstone and sandstone residuum of Triassic age. They are on uplands. Slope ranges from 2 to 15 percent.

Creedmoor soils generally are near Leaksville, Mayodan, Meadows, and Sheva soils. Creedmoor soils are deeper over bedrock than Leaksville and Sheva soils. They have gray colors in the subsoil, unlike Mayodan and Meadows soils.

Typical pedon of Creedmoor fine sandy loam, 2 to 7 percent slopes, 330 yards northwest of the intersection

of Virginia Highways 835 and 41 and 50 yards north of Virginia Highway 41, in a fallow field:

Ap—0 to 10 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many fine roots; many fine irregular and common fine tubular pores; about 5 percent rounded medium quartz gravel; very strongly acid; abrupt wavy boundary.

Bt1—10 to 24 inches; brownish yellow (10YR 6/6) sandy clay; few fine distinct yellowish red (5YR 5/6) mottles; strong thick platy structure parting to moderate fine subangular blocky; firm, sticky and plastic; common fine roots on faces of peds; common very fine tubular pores; many faint clay films on faces of peds; about 2 percent rounded medium quartz gravel; strongly acid; clear wavy boundary.

Bt2—24 to 37 inches; brownish yellow (10YR 6/6) sandy clay; many medium distinct light gray (10YR 7/2) and red (2.5YR 5/8) mottles; weak coarse subangular blocky structure; very firm, very sticky and very plastic; few very fine roots on faces of peds; common medium vesicular pores; common distinct brownish yellow (10YR 6/6) clay films on faces of peds; strongly acid; gradual wavy boundary.

Btg—37 to 65 inches; light gray (10YR 7/2) clay; few fine prominent red (2.5YR 4/8) mottles; weak coarse subangular blocky structure; very firm, sticky and very plastic; few fine vesicular pores; few prominent brownish yellow (10YR 6/6) clay films on faces of peds; strongly acid.

The thickness of the clayey Bt horizon ranges from 15 to 50 inches. The depth to hard bedrock is more than 60 inches. In unlimed areas reaction ranges from extremely acid to strongly acid.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 1 to 4. Some pedons have an E horizon. This horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2 to 4. It is sandy loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. In some pedons it has mottles with chroma of 2 or less. It is sandy clay loam, clay loam, sandy clay, or clay in the upper part and clay in the lower part.

The Btg horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 or 2. In some pedons it has mottles in shades of red, yellow, or brown. It is sandy clay or clay.

Some pedons have a BC horizon. This horizon has hue of 5YR to 10YR, value of 4 to 8, and chroma of 1 to 8. It has few to many mottles in shades of red, yellow, brown, or gray. It is sandy clay loam to clay loam.

The C horizon has hue of 5YR to 10YR, value of 4 to 8, and chroma of 1 to 8. It is sandy loam to clay loam saprolite.

Cullen Series

Soils of the Cullen series are very deep and well drained. They formed in residuum of mixed basic and acidic rocks. They are on uplands. Slope ranges from 2 to 15 percent.

Cullen soils generally are near Cecil, Enott, Madison, Orange, Poindexter, and Wilkes soils. Cullen soils have dark manganese streaks or concretions, unlike Cecil soils. They have a solum that is thicker than that of Enott, Poindexter, and Madison soils; are redder in the subsoil than Enott soils; have fewer flakes of mica in the lower part of the solum than Madison soils; and have more clay in the subsoil than Poindexter soils. They are deeper over bedrock than Orange and Wilkes soils. They do not have gray mottles in the subsoil, unlike Orange soils.

Typical pedon of Cullen clay loam, 2 to 7 percent slopes, severely eroded, 12 miles southwest of Chatham, 1,750 yards south of the intersection of Virginia Highways 750 and 869, and 30 yards west of Virginia Highway 750, in a pasture:

Ap—0 to 6 inches; yellowish red (5YR 4/6) clay loam; moderate coarse granular structure; friable, sticky and plastic; common fine and very fine roots; many fine tubular pores; moderately acid; clear smooth boundary.

Bt1—6 to 11 inches; red (2.5YR 4/6) clay; common fine distinct red (2.5YR 4/8) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; friable, sticky and plastic; common fine and very fine roots; common fine tubular pores; common faint clay films on faces of prisms; moderately acid; clear smooth boundary.

Bt2—11 to 27 inches; red (2.5YR 4/6) clay; moderate very fine subangular blocky structure; friable, sticky and plastic; common fine and very fine roots; many fine irregular exped pores; many distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—27 to 42 inches; red (2.5YR 4/6) clay; weak very fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; many fine irregular exped pores; many distinct clay films on faces of peds; about 2 percent angular fine and medium quartz gravel; few fine distinct dark reddish brown (5YR 2/2) manganese streaks; strongly acid; gradual wavy boundary.

Bt4—42 to 62 inches; red (2.5YR 4/8) silty clay; few fine distinct dark reddish brown (5YR 2/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine irregular exped pores; many distinct clay films on faces of peds; about 2 percent angular fine and medium quartz gravel; very strongly acid; gradual wavy boundary.

BC—62 to 75 inches; red (2.5YR 4/8) silty clay loam; few fine prominent yellow (10YR 7/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine irregular exped pores; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

C—75 to 90 inches; yellowish red (5YR 5/8) silt loam; common medium prominent yellow (10YR 7/8) mottles; massive; very friable, nonsticky and slightly plastic; about 10 percent weathered rock fragments; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to soft bedrock is more than 60 inches. The depth to hard bedrock is more than 72 inches. The content of gravel-sized crystalline rock fragments ranges from 0 to 15 percent throughout the profile. In unlimed areas reaction is strongly acid or moderately acid.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 4 to 8. It is loam in the less eroded areas and clay loam in severely eroded areas.

Some pedons have a BA horizon. This horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It is loam or clay loam.

The Bt horizon has hue of 10R or 2.5YR, value of 3 to 5, and chroma of 4 to 8. It is clay loam, silty clay loam, silty clay, or clay. Dark streaks or stains generally are throughout this horizon.

The BC horizon has hue of 10R or 2.5YR, value of 4 to 6, and chroma of 6 to 8. It is loam, silt loam, clay loam, or silty clay loam. It has dark streaks or stains in some pedons.

The C horizon has hue of 10YR to 10R and value and chroma of 4 to 8, or it is mottled and does not have a dominant matrix color. It is loam or silt loam.

Some pedons have a Cr horizon, which is weathered bedrock that crushes to loam or silt loam.

Enott Series

Soils of the Enott series are deep over soft bedrock and are well drained. They formed in residuum of dark basic rocks or mixed basic and acidic rocks. They are on uplands. Slope ranges from 2 to 25 percent.

Enott soils generally are near Appling, Cecil, Cullen, Orange, Poindexter, and Wilkes soils. Enott soils have a solum that is thinner than that of Appling, Cecil, and Cullen soils and have higher base saturation than those soils. They do not have gray mottles in the upper part of the solum, unlike Orange soils. They have more clay in the subsoil than Poindexter soils and have a solum that is thicker than that of Wilkes soils.

Typical pedon of Enott fine sandy loam, 2 to 7 percent slopes, 1,700 yards southwest of the junction of Virginia Highways 968 and 970 and 100 yards west of Virginia Highway 969, in an area of woodland:

A—0 to 6 inches; brownish yellow (10YR 6/6) fine sandy loam; weak fine and medium granular structure; very friable, nonsticky and nonplastic; many fine to coarse roots; many fine and medium interstitial and tubular pores; moderately acid; clear smooth boundary.

BA—6 to 10 inches; brownish yellow (10YR 6/6) fine sandy loam; many fine and medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, nonsticky and slightly plastic; many fine and medium roots; many fine and medium interstitial and tubular pores; few faint clay films on faces of peds and in pores; slightly acid; clear wavy boundary.

Bt1—10 to 18 inches; strong brown (7.5YR 5/8) clay; common medium distinct yellowish red (5YR 5/6) relict mottles; weak medium subangular blocky structure; firm, moderately sticky and moderately plastic; many fine and medium roots; common very fine and fine interstitial pores; few faint clay films on faces of peds and in pores; neutral; gradual wavy boundary.

Bt2—18 to 29 inches; yellowish brown (10YR 5/6) clay; moderate medium angular blocky structure; very firm, very sticky and very plastic; common very fine and fine roots between peds; common very fine and fine interstitial pores; few faint clay films on faces of peds, in pores, and on pressure faces; about 5 percent gravel; neutral; gradual wavy boundary.

BC—29 to 33 inches; light olive brown (2.5Y 5/4) sandy clay loam; many fine prominent greenish gray (5GY 5/1) remnants of weathered saprolite; moderate medium angular blocky structure; very firm, moderately sticky and very plastic; common very fine and fine roots between peds; few faint clay films on faces of peds; about 15 percent gravel; neutral; about 45 percent saprolite that crushes easily to loam; gradual wavy boundary.

C—33 to 42 inches; light olive brown (2.5Y 5/4), light yellowish brown (10YR 6/4), and greenish gray (5GY 5/1) fine sandy loam; massive; firm, slightly sticky and slightly plastic; neutral; gradual wavy boundary.

Cr—42 to 53 inches; light olive brown (2.5Y 5/4), light

yellowish brown (10YR 6/4), and greenish gray (5GY 5/1), weathered bedrock that crushes to fine sandy loam; massive; very firm; neutral.

The thickness of the solum ranges from 20 to 44 inches. The depth to soft bedrock ranges from 40 to 60 inches. The depth to hard bedrock is more than 60 inches. Reaction is strongly acid to mildly alkaline throughout the profile. The content of rock fragments ranges from 0 to 35 percent throughout the profile. Some pedons have few or common black manganese concretions. COLE ranges from .04 to .09.

The A horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. The Ap horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. It is fine sandy loam in the fine-earth fraction.

The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The BA or BE horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is loam, clay loam, or sandy clay loam in the fine-earth fraction.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. In some pedons it has relict mottles or has mottles with high or low chroma in lower part. It is clay, clay loam, or sandy clay loam in the fine-earth fraction.

The BC horizon has hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 1 to 8, or it is mottled with these colors and does not have a dominant matrix color. It is clay, clay loam, or sandy clay loam in the fine-earth fraction.

The C horizon is multicolored, commonly in shades of brown, yellow, black, green, olive, or gray. It is sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam.

The Cr horizon is multicolored, soft, weathered mafic or intermediate crystalline bedrock. It crushes to sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam.

Goldston Series

Soils of the Goldston series are shallow over soft bedrock and are excessively drained to well drained. They formed in residuum of phyllite rocks. They are on uplands. Slope ranges from 7 to 60 percent.

Goldston soils generally are near Tatum soils. Goldston soils have less clay in the subsoil than the nearby soils. Also, they have a thinner solum.

Typical pedon of Goldston very channery silt loam, in a wooded area of Goldston-Rock outcrop complex, 35 to 60 percent slopes, 10 yards below the top of a ridge on Smith Mountain and 3,500 yards due west of the intersection of Virginia Highways 777 and 778:

Oi—2 inches to 0; loose leaves, twigs, and partially decomposed organic matter.

A—0 to 3 inches; dark yellowish brown (10YR 4/4) very channery silt loam; weak fine granular structure; very friable, slightly sticky and nonplastic; many fine, common medium, and common coarse roots; many fine irregular pores; about 40 percent channers; very strongly acid; clear wavy boundary.

Bw1—3 to 9 inches; yellowish brown (10YR 5/4) very channery silt loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; common fine, common medium, and few coarse roots; common fine irregular pores; about 35 percent channers; moderately acid; clear wavy boundary.

Bw2—9 to 15 inches; yellowish brown (10YR 5/4) very channery silt loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and common very fine roots; common fine irregular pores; about 40 percent channers; moderately acid; abrupt wavy boundary.

Cr—15 to 22 inches; weathered, multicolored phyllite bedrock that crushes to silt loam.

R—22 inches; hard phyllite bedrock.

The thickness of the solum and the depth to weathered bedrock range from 10 to 20 inches. The depth to hard bedrock ranges from 20 to 40 inches. The content of channer-sized fragments of phyllite is more than 35 percent throughout the profile. In unlimed areas reaction is extremely acid to moderately acid throughout the profile.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. The Bw horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8.

Helena Series

Soils of the Helena series are very deep and moderately well drained. They formed in residuum of mixed acid and basic crystalline rocks. They are on uplands. Slope ranges from 2 to 15 percent.

Helena soils generally are near Appling, Pacolet, and Rion soils. Helena soils have grayish mottles in the Bt horizon, unlike Appling, Pacolet, and Rion soils.

Typical pedon of Helena sandy loam, 2 to 7 percent slopes, approximately 1,230 yards south-southwest of the junction of Virginia Highways 863 and 744 and 630 yards west of Virginia Highway 745, on the west side of Virginia Highway 744, in an area of woodland:

A—0 to 5 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable,

nonsticky and nonplastic; common medium and many fine roots; common fine tubular pores; about 5 percent rounded quartz gravel as much as three-quarters of an inch in size; slightly acid; abrupt smooth boundary.

E—5 to 14 inches; light yellowish brown (2.5Y 6/4) sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common fine roots; common fine tubular pores; about 2 percent rounded quartz gravel less than one-quarter inch in size; very strongly acid; clear wavy boundary.

BE—14 to 18 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; weak fine subangular blocky structure; friable, sticky and plastic; few fine roots; few fine tubular pores; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt1—18 to 27 inches; olive yellow (2.5Y 6/6) clay; common medium distinct light gray (2.5Y 7/2) mottles; moderate fine subangular blocky structure; firm, sticky and very plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—27 to 37 inches; light gray (5Y 7/2) clay loam; many medium distinct olive yellow (2.5Y 6/6) and few medium distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; very firm, sticky and very plastic; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—37 to 50 inches; light olive gray (5Y 6/2) sandy clay loam; many medium distinct yellowish brown (10YR 5/6) and common medium prominent reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; firm, slightly sticky and plastic; few fine roots; few fine irregular pores; few faint clay films on faces of peds; few rounded quartz pebbles less than one-quarter inch in size; extremely acid; gradual wavy boundary.

C—50 to 65 inches; light olive gray (5YR 6/2) sandy clay loam; massive; firm, slightly sticky and slightly plastic; few fine irregular pores; extremely acid.

Depth to the lower boundary of the clayey layers does not exceed 48 inches. The depth to hard bedrock is more than 5 feet. The content of quartz gravel as much as 1 inch in diameter ranges from 0 to 5 percent throughout the profile. Reaction is extremely acid to strongly acid in unlimed areas.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 2 to 4. The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 2 to 4. It is sandy loam or fine sandy loam.

Some pedons have a BE horizon. This horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 2 to 4. It is fine sandy loam to sandy clay loam.

The Bt horizon has hue of 7.5YR to 5Y, value of 5 to 8, and chroma of 3 to 8. It has common or many low- or high-chroma mottles. It is clay, sandy clay, or clay loam.

The BC horizon has hue of 7.5YR to 5Y, value of 5 to 8, chroma of 3 to 8. It has common or many low- or high-chroma mottles. It is sandy loam, sandy clay loam, or clay loam.

The C horizon has hue of 5YR to 5Y, value of 5 to 8, and chroma of 1 to 8. It is sandy loam or sandy clay loam.

Hiwassee Series

Soils of the Hiwassee series are very deep and well drained. They formed in old alluvium on high river terraces. Slope ranges from 2 to 15 percent.

Hiwassee soils generally are near Cecil, Madison, Pacolet, and Wickham soils. Hiwassee soils have darker red colors throughout the solum than the nearby soils.

Typical pedon of Hiwassee clay loam, 2 to 7 percent slopes, severely eroded, 765 yards east-northeast of Virginia Highway 62 and 865 yards northeast of the junction of Virginia Highways 62 and 899, in a field of hay:

Ap—0 to 6 inches; dark reddish brown (5YR 3/4) clay loam; moderate medium granular structure; friable, sticky and slightly plastic; many fine roots; moderately acid; clear smooth boundary.

Bt1—6 to 28 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm, very sticky; few fine roots; common fine tubular pores; many distinct clay films on faces of peds; moderately acid; clear wavy boundary.

Bt2—28 to 44 inches; dark red (2.5YR 3/6) clay; common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; few fine tubular pores; many distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—44 to 65 inches; dark reddish brown (2.5YR 3/4) clay loam; many medium distinct strong brown (7.5YR 5/8) and common medium faint red (10R 4/6) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few very fine tubular pores; few distinct clay films on vertical faces of peds; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock is more than 60

inches. Gravel- and cobble-sized rock fragments make up 0 to 35 percent of the Ap, Bt, and BC horizons. Stone lines of gravel and cobbles are in some pedons. In unlimed areas reaction ranges from very strongly acid to slightly acid throughout the profile.

The Ap horizon has hue of 5YR, value of 3, and chroma of 3 or 4. It is sandy loam, loam, or clay loam in the fine-earth fraction.

The Bt horizon has hue of 10R or 2.5YR, value of 3, and chroma of 4 to 6. In the fine-earth fraction, it is clay loam or clay.

The BC horizon has hue of 10R or 2.5YR, value of 3, and chroma of 4 to 6. In the fine-earth fraction, it is clay loam or silty clay loam.

Leaksville Series

Soils of the Leaksville series are moderately deep and poorly drained. They formed in shale residuum of Triassic age. They are in depressions and at the head of drainageways on uplands. Slope ranges from 0 to 4 percent.

Leaksville soils generally are near Creedmoor, Meadows, and Sheva soils. Leaksville soils have more gray in the solum than the nearby soils.

Typical pedon of Leaksville silt loam, 0 to 4 percent slopes, 365 yards northwest of the intersection of Virginia Highways 859 and 960 and 115 yards northeast of Virginia Highway 859, in a cultivated field:

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable, sticky and nonplastic; many fine and common medium roots; many fine and common medium tubular pores; about 10 percent subrounded shale fragments and manganese concretions; strongly acid; abrupt smooth boundary.

Btg1—7 to 17 inches; grayish brown (10YR 5/2) clay; many fine distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak medium angular blocky; very firm, very sticky and very plastic; few fine roots; few fine tabular pores; about 10 percent angular shale fragments; very strongly acid; clear wavy boundary.

Btg2—17 to 21 inches; grayish brown (2.5Y 5/2) clay; common fine distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak medium angular blocky; very firm, very sticky and very plastic; few fine roots; few fine tubular pores; about 10 percent angular shale fragments; very strongly acid; clear wavy boundary.

Cr—21 to 30 inches; grayish brown (10YR 5/2) and strong brown (7.5YR 5/8), soft shale bedrock that crushes to silt loam; massive; surface of shale fragments coated with grayish brown (10YR 5/2) clay.

R—30 inches; hard, dark grayish brown shale.

The thickness of the clayey Bt horizon ranges from 4 to 20 inches. The depth to soft bedrock ranges from 20 to 40 inches. The depth to hard bedrock ranges from 24 to 60 inches. In unlimed areas reaction is very strongly acid or strongly acid throughout the profile. The content of gravel-sized fragments of shale ranges from 2 to 35 percent in the Ap horizon and from 2 to 15 percent in the Btg horizon.

The Ap horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 3. The Btg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is clay loam, silty clay, or clay.

The Leaksville soils in this survey area are taxadjuncts because they have low pH. This difference, however, does not significantly affect the use and management of the soils.

Madison Series

Soils of the Madison series are very deep and well drained. They formed in residuum of micaceous metamorphic rocks. They are on uplands. Slope ranges from 15 to 45 percent.

Madison soils generally are near Cecil, Cullen, and Hiwassee soils. Madison soils have a solum that is thinner than that of Cecil, Cullen, and Hiwassee soils and have more mica in the upper part of the solum than those soils. They are not so red as Hiwassee soils.

Typical pedon of Madison fine sandy loam, 15 to 25 percent slopes, 1.4 miles north-northwest of the intersection of Virginia Highways 41 and 703 and 835 yards west of the intersection of Virginia Highways 703 and 838, in an area of woodland:

Oi—1 inch to 0; leaves, twigs, and partially decomposed organic material and root mat.

A—0 to 3 inches; brown (7.5YR 5/4) fine sandy loam; weak fine granular structure; very friable, nonsticky and slightly plastic; many fine and medium and common coarse roots; many fine random tubular pores; about 5 percent angular and semirounded quartzite gravel; common fine flakes of mica; strongly acid; clear smooth boundary.

Bt1—3 to 6 inches; yellowish red (5YR 5/8) clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and medium and common coarse roots; common fine and few medium tubular pores; common distinct clay films on faces of peds; about 5 percent angular and semirounded quartzite gravel; common fine

flakes of mica; very strongly acid; clear wavy boundary.

Bt2—6 to 19 inches; red (2.5YR 4/6) clay; moderate fine subangular blocky structure; firm, slightly sticky and plastic; common fine and few medium and coarse roots; common fine tubular pores; many distinct clay films on faces of peds; about 5 percent weathered gravel-sized mica schist fragments; many fine flakes of mica, increasing in quantity with increasing depth and imparting a greasy quality; very strongly acid; gradual wavy boundary.

BC—19 to 37 inches; red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and few medium and coarse roots; common fine tubular pores; few faint clay films on faces of peds; about 25 percent strongly weathered gravel-sized mica schist fragments that crush to loam; many fine flakes of mica that impart a greasy quality; very strongly acid; abrupt wavy boundary.

C—37 to 65 inches; red (2.5YR 4/8) loam saprolite; massive; friable, nonsticky and nonplastic; few fine roots; few distinct red (2.5YR 4/6) clay flows; many fine flakes of mica that impart a greasy quality; very strongly acid.

The thickness of the solum ranges from 20 to 40 inches. The thickness of the clayey Bt horizon ranges from 12 to 30 inches. The depth to hard bedrock is more than 60 inches. The upper horizons have common or many fine and medium flakes of mica, and the lower horizons have many flakes of mica. Gravel-sized quartz fragments make up 0 to 15 percent of the A, BA, BE, and E horizons and 0 to 5 percent of the Bt, BC, and C horizons. In unlimed areas reaction is very strongly acid or strongly acid.

The A horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 6. The E horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is sandy loam or fine sandy loam.

The BA or BE horizon, if it occurs, has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8. It is loam, sandy clay loam, or sandy loam.

The Bt and BC horizons have hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. The Bt horizon is clay loam or clay. The BC horizon is loam, sandy clay loam, or clay loam.

The C horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 2 to 8. It is loam or sandy clay loam saprolite.

Mattaponi Series

Soils of the Mattaponi series are very deep, are moderately well drained, and are moderately slowly permeable in the lower part of the subsoil. They formed in old alluvium or colluvium, which overlies residuum. They are on uplands. Slope ranges from 2 to 15 percent.

Mattaponi soils generally are near Appling, Cecil, and Mayodan soils. Mattaponi soils are yellower in the subsoil than Cecil soils and have less mica in the subsoil than those soils. They have gray mottles in the lower part of the subsoil, unlike Appling, Cecil, and Mayodan soils.

Typical pedon of Mattaponi sandy loam, 2 to 7 percent slopes, 400 yards west of Virginia Highway 703, about 1,134 yards northwest of the junction of Virginia Highways 703 and 41, and 1,200 yards south-southwest of the junction of Virginia Highways 703 and 838, in a cultivated field:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable, slightly sticky and nonplastic; common fine roots; many fine and very fine continuous irregular pores; about 5 percent fine rounded quartzite gravel; moderately acid; abrupt smooth boundary.

Bt1—8 to 33 inches; yellowish brown (10YR 5/8) clay; common fine prominent red (2.5YR 4/8) mottles, which are firm and slightly brittle when moist and are slightly sandier than the surrounding matrix; moderate medium subangular blocky structure; friable, very sticky and plastic; common fine roots; common fine continuous tubular pores; about 5 percent fine angular quartz gravel; many distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—33 to 41 inches; strong brown (7.5YR 5/8) and very pale brown (10YR 7/3) sandy clay occurring as alternating bands that are smooth and horizontal; common medium prominent red (2.5YR 4/6) mottles; moderate thick platy structure parting to weak fine subangular blocky; firm and slightly brittle in place, sticky and plastic; common medium vesicular pores; about 5 percent angular fine and medium quartz gravel; many distinct light yellowish brown (10YR 6/4) clay films on the upper faces of plates; strongly acid; gradual smooth boundary.

BC—41 to 76 inches; strong brown (7.5YR 5/8), very pale brown (10YR 7/3), and brownish yellow (10YR 6/6) sandy clay loam; common medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; firm and slightly brittle in place, sticky and plastic; few fine discontinuous irregular pores; common distinct yellowish brown (10YR 5/6) clay films on vertical faces of peds; about 5 percent angular fine quartz gravel; common fine flakes of mica; strongly acid; gradual wavy boundary.

2C—76 to 99 inches; very pale brown (10YR 7/3) sandy clay loam; many medium distinct reddish yellow (7.5YR 6/8) and common medium prominent red (2.5YR 4/6) mottles; massive; firm, sticky and plastic; few fine discontinuous irregular pores; many fine flakes of mica; very strongly acid.

The thickness of the solum and the depth to hard bedrock are more than 60 inches. Rounded and angular gravel-sized quartz fragments make up 0 to 15 percent of the Ap horizon and 0 to 35 percent of the Bt, BC, and 2C horizons. The part of the profile above the 2C horizon has common, few, or no flakes of mica, and the 2C horizon has common or many flakes of mica. In unlimed areas reaction is very strongly acid or strongly acid.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 7, and chroma of 2 to 8.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. In the lower part it commonly is mottled with these colors or has both high- and low-chroma mottles. The fine-earth fraction is clay loam, sandy clay, or clay.

The BC horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. In the fine-earth fraction, it is sandy clay loam or clay loam.

The 2C horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. It is multicolored in some pedons. In the fine-earth fraction, it is sandy clay loam, clay loam, or sandy clay.

Mayodan Series

Soils of the Mayodan series are very deep and well drained. They formed in siltstone and sandstone residuum of Triassic age. They are on uplands. Slope ranges from 2 to 50 percent.

Mayodan soils generally are near Creedmoor, Mattaponi, Meadows, Pinkston, Sheva, and Stoneville soils. Mayodan soils do not have grayish mottles in the subsoil, unlike Creedmoor, Mattaponi, and Sheva soils. They have a solum that is thicker than that of Meadows and Pinkston soils and have more clay in the subsoil than those soils. The have a yellower hue in the subsoil than Stoneville soils.

Typical pedon of Mayodan fine sandy loam, 2 to 7 percent slopes, 17 miles southwest of Chatham and 65 yards southeast of the intersection of U.S. Highway 58 and Virginia Highway 878, in a fallow field:

Ap—0 to 9 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; common fine and medium roots; many fine irregular pores; about 5 percent fine and medium quartzite gravel; very strongly acid; abrupt smooth boundary.

Bt1—9 to 16 inches; yellowish red (5YR 5/6) clay; few medium prominent red (2.5YR 4/6) mottles; weak fine subangular blocky structure; friable, slightly sticky and plastic; many fine and medium roots; common fine irregular and tubular pores; common faint clay films on faces of peds; about 2 percent rounded fine and medium quartzite gravel; strongly acid; clear smooth boundary.

Bt2—16 to 39 inches; red (2.5YR 4/6) clay; moderate very fine subangular blocky structure; firm, sticky and plastic; common fine roots; many fine irregular and few fine tubular pores; common distinct yellowish brown (10YR 5/8) clay films on faces of peds; about 5 percent rounded fine quartzite gravel; strongly acid; gradual wavy boundary.

BC—39 to 51 inches; red (2.5YR 4/6) clay loam; common fine prominent reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine irregular pores; common distinct red (2.5YR 4/6) clay films on faces of peds; about 5 percent rounded fine quartzite gravel; common fine flakes of mica; very strongly acid; clear wavy boundary.

C—51 to 65 inches; red (2.5YR 4/6) sandy clay loam saprolite; common fine prominent reddish yellow (7.5YR 6/6) mottles; massive; friable, slightly sticky and slightly plastic; few fine irregular pores; few thick red (2.5YR 4/6) clay flows; very strongly acid.

The thickness of the solum ranges from 30 to 50 inches. The thickness of the clayey Bt horizon ranges from 15 to 45 inches. The depth to hard bedrock is more than 65 inches. Gravel-sized quartzite rock fragments make up 0 to 15 percent of the A, Ap, BA, E, and BE horizons and 0 to 5 percent of the Bt, BC, and C horizons. In unlimed areas reaction is very strongly acid or strongly acid.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. Some pedons have an E horizon. This horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 or 4. It is sandy loam or fine sandy loam.

Some pedons have a BA or BE horizon. This horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. It is sandy clay loam or clay loam.

The upper part of the Bt horizon has hue of 2.5YR to 7.5YR, value of 5 or 6, and chroma of 6 to 8. The lower part has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 8. Few to many high-chroma mottles are throughout the Bt horizon. This horizon is sandy clay, clay loam, or clay.

The BC horizon has hue of 2.5YR to 7.5YR, value of

3 to 6, and chroma of 2 to 8. In some pedons it has few or common fragments of soft, weathered rock. It is loam, sandy clay loam, clay loam, or sandy clay.

The C horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 2 to 8. It is loam, sandy loam, sandy clay loam, or clay loam saprolite.

Meadows Series

Soils of the Meadows series are shallow over soft bedrock and are somewhat excessively drained. They formed in siltstone, mudstone, and shale residuum of Triassic age. They are on uplands. Slope ranges from 2 to 15 percent.

Meadows soils generally are near Creedmoor, Leaksville, Mayodan, Pinkston, Sheva, and Stoneville soils. Meadows soils are shallower over bedrock than the nearby soils. They do not have gray mottles in the solum, unlike Creedmoor, Leaksville, and Sheva soils.

Typical pedon of Meadows gravelly loam, 2 to 7 percent slopes, 1,800 yards southeast of the intersection of Virginia Highways 690 and 683, about 2,300 yards east-northeast of the intersection of Virginia Highways 649 and 691, and 230 yards east of two small farm ponds, in a fallow field:

A—0 to 4 inches; dark reddish brown (5YR 3/3) gravelly loam, reddish brown (5YR 5/3) dry; weak fine granular structure; friable, sticky and slightly plastic; many fine and very fine roots; many very fine irregular pores; about 25 percent gravel-sized fragments of reddish brown siltstone; slightly acid; clear wavy boundary.

Bw—4 to 9 inches; dark reddish brown (5YR 3/3) gravelly loam; moderate fine subangular blocky structure; friable, sticky and slightly plastic; common fine roots; many very fine irregular pores; about 30 percent gravel-sized fragments of reddish brown siltstone; slightly acid; clear wavy boundary.

C—9 to 16 inches; reddish brown (5YR 4/3) silt loam saprolite; massive; firm in place; common fine and very fine roots; slightly acid; clear wavy boundary.

Cr—16 to 24 inches; weathered, reddish brown (5YR 4/3) siltstone that crushes to silt loam.

R—24 inches; hard, reddish brown siltstone.

The loamy material is less than 20 inches deep over partially weathered siltstone, mudstone, or shale. The depth to hard bedrock ranges from 20 to 40 inches. In unlimed areas reaction is strongly acid to slightly acid throughout the profile. Gravel-sized rock fragments, dominantly siltstone, mudstone, or shale, make up 2 to 35 percent of the A and Ap horizons, 15 to 35 percent of the Bw horizon, and 5 to 25 percent of the C horizon. Some of the rock fragments are break down easily.

The A or Ap horizon has hue of 2.5YR or 5YR, value of 3 or less, and chroma of 2 to 4.

The Bw horizon has hue of 2.5YR or 5YR and value and chroma of 2 to 4. It is loam or silt loam in the fine-earth fraction.

The C horizon, if it occurs, has hue of 2.5YR and value and chroma of 2 to 4. It is loam or silt loam saprolite in the fine-earth fraction.

The Cr horizon has hue of 2.5YR or 5YR, value of 3 or 4, chroma of 1 to 4. It is weathered siltstone, mudstone, or shale that crushes to loam or silt loam.

Orange Series

Soils of the Orange series are deep and moderately well drained. They formed in residuum of hornblende gneiss and other basic rocks. They are on uplands. Slope ranges from 0 to 4 percent.

Orange soils generally are near Cullen, Enott, Poindexter, and Wilkes soils. Orange soils have gray mottles in the B horizon, unlike Cullen, Poindexter, and Wilkes soils. They have gray mottles in the upper part of the B horizon, unlike Enott soils. They have more clay in the B horizon than Poindexter and Wilkes soils.

Typical pedon of Orange loam, 0 to 4 percent slopes, 1,000 yards south of the intersection of Virginia Highway 713 and the Southern Railroad tracks, 40 yards west of Virginia Highway 713, and 6 yards north of a farm lane, in an area of woodland:

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam; moderate fine granular structure; very friable, nonsticky and nonplastic; common coarse and many fine and medium roots; many fine tubular pores; strongly acid; clear smooth boundary.

E—5 to 10 inches; grayish brown (10YR 4/2) loam; weak medium subangular blocky structure parting to moderate fine granular; very friable, nonsticky and nonplastic; many medium and fine roots; common fine tubular pores; about 2 percent fine manganese concretions; moderately acid; abrupt smooth boundary.

Bt1—10 to 24 inches; yellowish brown (10YR 5/6) clay; common fine distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very firm, very sticky and very plastic; few fine and medium roots; common very fine tubular pores; common distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—24 to 28 inches; light olive brown (2.5Y 5/4) clay; few fine prominent light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; very firm, sticky and very plastic; few fine roots; common very fine tubular pores; common faint clay films on faces of peds; common fine green and black flakes

of basic rock; slightly acid; gradual wavy boundary.

C—28 to 42 inches; olive (5Y 5/4) sandy clay loam saprolite; many medium distinct brownish yellow (10YR 6/8) and dark greenish gray (5GY 4/1) mottles; massive; friable, slightly sticky and slightly plastic; few fine roots; common fine and very fine tubular pores; common pressure faces that have few prominent clay flows; moderately acid; gradual wavy boundary.

Cr—42 to 55 inches; olive (5Y 5/3), brownish yellow (10YR 6/6), and dark greenish gray (5G 4/1), weathered hornblende gneiss bedrock that crushes to fine sandy loam.

R—55 inches; dark greenish gray, hard hornblende gneiss bedrock.

The thickness of the solum ranges from 20 to 36 inches. The depth to bedrock ranges from 40 to 60 inches. Gravel-sized rock fragments, mostly quartz and hornblende gneiss, make up 0 to 10 percent of the A, E, Bt, BC, and C horizons. In unlimed areas reaction is strongly acid or moderately acid in the A and E horizons and in the upper part of the Bt horizon. It is moderately acid to mildly alkaline in the lower part of the Bt horizon and in the BC and C horizons.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It is fine sandy loam or loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. The BC horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 8, or it is mottled and does not have a dominant matrix color. It is clay loam or clay.

The C horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 2 to 8, or it is multicolored. It is sandy loam, loam, or sandy clay loam saprolite.

The Cr horizon has hue of 10YR to 5Y or of 5G, value of 4 to 6, and chroma of 1 to 8, or it is multicolored. It is partially weathered basic igneous and metamorphic rock that crushes to fine sandy loam or sandy loam.

Pacolet Series

Soils of the Pacolet series are very deep and well drained. They formed in residuum of granite and granite gneiss. They are on uplands. Slope ranges from 2 to 45 percent.

Pacolet soils generally are near Appling, Ashlar, Cecil, Helena, Hiwassee, and Rion soils. Pacolet soils have a solum that is thinner than that of Appling and Cecil soils, are redder in the subsoil than Appling soils, and have more clay in the subsoil than Ashlar and Rion soils. They do not have gray mottles in the subsoil, unlike Helena soils, and do not have red colors, unlike Hiwassee soils.

Typical pedon of Pacolet fine sandy loam, 15 to 25 percent slopes, 1,452 yards south of the intersection of Virginia Highways 730 and 655, about 1,100 yards north of the intersection of Virginia Highways 726 and 655, and 308 yards west of Virginia Highway 655, in an area of woodland:

Oi—1 inch to 0; leaves, twigs, and partially decomposed organic material and live root mat.

A—0 to 2 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many fine and very fine and few medium roots; many fine random tubular pores; about 2 percent angular quartz gravel; very strongly acid; abrupt smooth boundary.

E—2 to 4 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; common fine and medium and few coarse roots; common fine vertical tubular pores; about 2 percent angular quartz gravel; few fine flakes of mica; very strongly acid; abrupt wavy boundary.

BE—4 to 10 inches; yellowish red (5YR 4/6) loam; common fine distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium and few coarse roots; common fine random tubular pores; few faint clay films on faces of peds; about 2 percent angular quartz gravel; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bt1—10 to 18 inches; red (2.5YR 4/8) clay; few fine distinct brownish yellow (10YR 6/6) mottles; moderate fine subangular blocky structure; firm, sticky and plastic; common fine and medium roots; common fine irregular and few oblique tubular pores; many distinct clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt2—18 to 27 inches; red (2.5YR 4/8) clay loam; common medium prominent brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; common fine irregular and few fine oblique tubular pores; few faint red (2.5YR 4/8) clay films on faces of peds; about 2 percent soft white gravel-sized feldspar fragments; common medium flakes of mica; very strongly acid; gradual wavy boundary.

BC—27 to 40 inches; red (2.5YR 4/8) sandy clay loam; common medium prominent brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky

structure; friable, nonsticky and slightly plastic; few fine roots; few medium irregular pores; few faint clay flows and common distinct clay coatings in pores and root channels; about 2 percent soft gravel-sized feldspar fragments; common fine flakes of mica; very strongly acid; clear smooth boundary.

C—40 to 65 inches; mottled red (2.5YR 4/8), yellowish red (5YR 4/6), and brownish yellow (10YR 6/6) sandy loam saprolite; massive; friable, nonsticky and nonplastic; few fine roots; few medium irregular pores; common distinct clay coatings in pores and root channels; about 2 percent soft gravel-sized feldspar fragments; common fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 20 to 40 inches. The clayey part of the Bt horizon is at least 12 inches thick and extends to a depth of 18 to 30 inches. The depth to hard bedrock is more than 60 inches. Gravel-sized rock fragments make up 0 to 15 percent of the A, E, BE, Bt, and BC horizons. In unlimed areas reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 or 4. It is fine sandy loam in the less eroded areas and sandy clay loam in severely eroded areas.

The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 or 4. It is fine sandy loam or sandy loam.

The BE horizon, if it occurs, has hue of 5YR, value of 4 or 5, and chroma of 6 to 8. It is loam, sandy clay loam, or clay loam.

The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8, or it is mottled in shades of red, yellow, or brown and has no dominant matrix color. In most pedons it has high-chroma mottles. It is clay loam or clay.

The BC horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It typically is mottled. It is sandy clay loam or clay loam.

The C horizon has hue of 2.5YR to 10YR, value of 4 to 8, and chroma of 6 to 8, or it is multicolored and does not have a dominant matrix color. It is sandy loam, loam, or sandy clay loam saprolite.

Pinkston Series

Soils of the Pinkston series are moderately deep and excessively drained. They formed in sandstone residuum of Triassic age. They are on uplands. Slope ranges from 7 to 50 percent.

Pinkston soils generally are near Mayodan, Stoneville, and Meadows soils. Pinkston soils have less clay in the subsoil than Mayodan and Stoneville soils and have a solum that is thicker than that of Meadows soils.

Typical pedon of Pinkston cobbly sandy loam, 7 to 15 percent slopes, 300 yards northwest of Virginia Highway 1,084 and 1,065 yards northeast of the intersection of Virginia Highways 1084 and 686, in an area of woodland:

Oi—1 inch to 0; loose leaves, twigs, and partially decomposed organic matter.

A—0 to 5 inches; dark brown (10YR 4/3) cobbly sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; many fine tubular pores; about 30 percent angular cobbles; very strongly acid; clear wavy boundary.

E—5 to 8 inches; light yellowish brown (10YR 6/4) cobbly sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common fine roots; many fine vesicular and tubular pores; about 30 percent angular cobbles; very strongly acid; clear wavy boundary.

Bw—8 to 13 inches; brownish yellow (10YR 6/6) sandy loam; moderate medium subangular blocky structure; friable, nonsticky and nonplastic; few fine roots; many fine vesicular and tubular pores; about 15 percent gravel; very strongly acid; clear wavy boundary.

Bw/Bt—13 to 18 inches; about 70 percent yellowish brown (10YR 5/6) fine sandy loam (Bw); about 30 percent lenses and irregularly shaped bodies of strong brown (7.5YR 5/6) sandy clay loam that has few distinct clay films on faces of peds (Bt); common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable, nonsticky and slightly plastic; few very fine roots; many fine vesicular and tubular pores; about 15 percent gravel; very strongly acid; gradual irregular boundary.

Cr—18 to 29 inches; dark yellowish brown (10YR 4/6) sandy loam saprolite; very strongly acid; gradual irregular boundary.

R—29 inches; unweathered sandstone bedrock.

The thickness of the solum ranges from 12 to 18 inches. The depth to hard bedrock ranges from 20 to 40 inches. Gravel- and cobble-sized fragments of sandstone make up 15 to 35 percent of the A, E, Bw, and Bw/Bt horizons and 0 to 35 percent of the C horizon. In unlimed areas reaction is very strongly acid or strongly acid.

The A horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. The E horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6.

The B horizon has hue of 5YR to 10YR, value of 4

to 6, and chroma of 4 to 8. In the fine-earth fraction, it is dominantly sandy loam, fine sandy loam, or loam but has lenses and pockets of sandy clay loam or clay loam having clay films on faces of peds or as bridges.

The C horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 3 to 8, and chroma of 1 to 8. In the fine-earth fraction, it is sandy loam, loam, or fine sandy loam saprolite.

Poindexter Series

Soils of the Poindexter series are moderately deep over soft bedrock and are well drained. They formed in residuum of basic rocks or a mixture of basic and acidic rocks. They are on uplands. Slope ranges from 7 to 25 percent.

Poindexter soils generally are near Cullen, Enott, Orange, and Wilkes soils. Poindexter soils have less clay in the Bt horizon than Cullen, Enott, and Orange soils and have a solum that is thicker than that of Wilkes soils.

Typical pedon of Poindexter fine sandy loam, 15 to 25 percent slopes, 1,388 yards south of the intersection of Virginia Highways 968 and 970 and 573 yards west of Virginia Highway 970, in an area of woodland:

A—0 to 1 inch; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable, slightly sticky and slightly plastic; many fine and medium roots; many fine tubular pores; strongly acid; abrupt smooth boundary.

E—1 to 4 inches; olive brown (2.5Y 4/4) fine sandy loam; weak coarse granular structure; very friable, slightly sticky and nonplastic; many fine and medium and few coarse roots; many fine tubular pores; strongly acid; clear smooth boundary.

EB—4 to 10 inches; olive brown (2.5Y 4/4) fine sandy loam; weak coarse subangular blocky structure; very friable, slightly sticky and nonplastic; common medium and few coarse roots; many fine tubular pores; strongly acid; clear wavy boundary.

Bt—10 to 18 inches; dark yellowish brown (10YR 4/4) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; many fine tubular pores; few fine flakes of mica; few distinct clay films on faces of peds; moderately acid; clear wavy boundary.

BC—18 to 23 inches; olive brown (2.5Y 4/4) fine sandy loam; moderate medium subangular blocky structure; friable, nonsticky and nonplastic; common fine roots; many fine tubular pores; common fine flakes of mica; moderately acid; clear smooth boundary.

C—23 to 27 inches; mottled olive brown (2.5Y 4/4) and brown (10YR 5/3) fine sandy loam saprolite; massive; friable, nonsticky and nonplastic; few fine roots; common fine irregular pores; common fine flakes of mica; moderately acid; clear smooth boundary.

Cr—27 to 55 inches; partially weathered hornblende gneiss that crushes to fine sandy loam; massive; firm, nonsticky and nonplastic; neutral.

R—55 inches; hard hornblende gneiss.

The thickness of the solum ranges from 14 to 36 inches. The depth to weathered bedrock ranges from 20 to 40 inches. The depth to hard bedrock ranges from 40 to 60 inches. Gravel-sized fragments of quartz and hornblende gneiss make up 0 to 15 percent of the A, E, EB, Bt, and BC horizons. Reaction ranges from strongly acid to neutral.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 4. The E horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. It is fine sandy loam or loam. Some pedons do not have an E horizon.

The EB horizon and the BE horizon, if it occurs, have hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 8. They are fine sandy loam or loam.

The Bt horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 8. It is dominantly loam, sandy clay loam, or clay loam. In some pedons, however, it has thin lenses of clay in the lower part.

The BC horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 8. It is sandy loam, fine sandy loam, or loam.

The C horizon is multicolored in shades of olive, black, yellow, or brown. It is fine sandy loam, loam, or sandy clay loam saprolite.

The Cr horizon is multicolored, partially weathered hornblende gneiss that crushes to sandy loam or fine sandy loam.

Rion Series

Soils of the Rion series are very deep and well drained. They formed in residuum of granite and granite gneiss. The They are on uplands. Slope ranges from 7 to 15 percent.

Rion soils generally are near Appling, Ashlar, Cecil, Helena, and Pacolet soils. Rion soils have a solum that is thicker than that of Ashlar soils and have more clay in the subsoil than those soils. They have a solum that is thinner than that of Appling and Cecil soils. They have less clay in the subsoil than Appling, Cecil, and Pacolet soils. They do not have gray mottles in the subsoil, unlike Helena soils.

Typical pedon of Rion fine sandy loam, 7 to 15 percent slopes, 1,200 yards southeast of the

intersection of Virginia Highways 729 and 726 and 130 yards west of Virginia Highway 728, in a fallow field:

Ap—0 to 10 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; common fine roots; many fine and very fine random tubular pores; about 10 percent angular medium and coarse quartz gravel; few fine flakes of mica; strongly acid; abrupt smooth boundary.

BA—10 to 16 inches; brown (7.5YR 4/4) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and plastic; common fine and few coarse roots; many fine random tubular pores; few faint clay films on faces of peds; about 5 percent angular medium quartz gravel; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bt—16 to 28 inches; strong brown (7.5YR 5/8) clay loam; common medium distinct light yellowish brown (10YR 6/4) mottles; moderate fine subangular blocky structure; firm, sticky and plastic; common fine roots; few fine irregular pores; common distinct clay films on faces of peds; about 5 percent angular medium quartz gravel; few fine flakes of mica; very strongly acid; clear wavy boundary.

BC—28 to 35 inches; yellowish brown (10YR 5/6) and light red (2.5YR 6/6) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few fine irregular pores; common faint clay films on faces of peds; about 5 percent angular medium quartz gravel; common fine flakes of mica; very strongly acid; clear wavy boundary.

C1—35 to 42 inches; strong brown (7.5YR 5/8) and yellow (2.5Y 7/6) sandy loam; massive; friable, nonsticky and nonplastic; few fine roots; about 5 percent angular fine quartz gravel; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C2—42 to 65 inches; very pale brown (10YR 7/3) and reddish yellow (7.5YR 6/6) sandy loam; massive; very friable, nonsticky and nonplastic; many fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 20 to 40 inches. The depth to hard bedrock is more than 60 inches. The content of gravel-sized quartz and granite fragments ranges from 0 to 10 percent throughout the profile. Reaction is very strongly acid or strongly acid throughout the profile.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. Some pedons have a BA horizon. This horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam or sandy clay loam.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. In most pedons it has high-chroma mottles. It is sandy loam, sandy clay loam, or clay loam.

The BC horizon has hue of 2.5YR to 10YR, value of 5 or 6, and chroma of 6 to 8. It is loam, sandy clay loam, or clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 to 8, and chroma of 3 to 6, or it is mottled with these colors and does not have a dominant matrix color.

Riverview Series

Soils of the Riverview series are very deep and well drained. They formed in alluvium on flood plains. Slope ranges from 0 to 2 percent.

Riverview soils generally are near Chenneby, Toccoa, and Wehadkee soils. Riverview soils have more clay throughout than Toccoa soils. They do not have gray mottles in the upper part of the B horizon, unlike Chenneby and Wehadkee soils.

Typical pedon of Riverview silt loam, 0 to 2 percent slopes, occasionally flooded, 500 yards north-northwest of the bridge at Virginia Highway 880 and the Dan River and 165 yards southwest of Virginia Highway 880, in a fallow field:

Ap—0 to 11 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; many fine tubular pores; common fine flakes of mica; strongly acid; gradual smooth boundary.

Bw1—11 to 28 inches; dark yellowish brown (10YR 3/6) loam; moderate coarse subangular blocky structure; friable, sticky and plastic; many fine roots; common fine and few medium tubular pores; few distinct brown (10YR 4/3) silt coatings on faces of peds; common fine flakes of mica; moderately acid; gradual smooth boundary.

Bw2—28 to 43 inches; dark yellowish brown (10YR 4/6) loam; moderate coarse subangular blocky structure; friable, sticky and slightly plastic; common fine roots; common fine tubular pores; few distinct brown (10YR 4/3) silt coatings on faces of peds; about 2 percent rounded fine gravel; common fine flakes of mica; moderately acid; gradual wavy boundary.

C—43 to 65 inches; dark yellowish brown (10YR 4/6) loam; massive; very friable, slightly sticky and nonplastic; few fine roots; common fine tubular pores; about 2 percent rounded fine gravel; common fine flakes of mica; moderately acid.

The thickness of the solum ranges from 24 to 50 inches. The depth to bedrock is more than 60 inches. Few or common flakes of mica are throughout the profile. In unlimed areas reaction ranges from strongly acid to moderately acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. Value of 3 is limited to horizons that are 7 or less inches thick.

The Bw horizon has hue of 7.5YR, value of 4 or 5, and chroma of 3 to 6 or hue of 10YR, value of 3 to 5, and chroma of 4 to 8. In some pedons it has low-chroma mottles below a depth of 24 inches. It is loam, silt loam, or silty clay loam.

The C horizon has hue of 7.5YR or 10YR and value and chroma of 4 to 8. It is sandy loam, fine sandy loam, loam, or silt loam.

Sheva Series

Soils of the Sheva series are moderately deep over soft bedrock and are moderately well drained. They formed in sandstone or siltstone residuum of Triassic age. They are on uplands. Slope ranges from 2 to 15 percent.

Sheva soils generally are near Creedmoor, Leaksville, Mayodan, and Meadows soils. Sheva soils have a solum that is thinner than that of Creedmoor and Meadows soils. They are less gray in the subsoil than Leaksville soils and more gray in the subsoil than Mayodan soils.

Typical pedon of Sheva fine sandy loam, 2 to 7 percent slopes, 300 yards south-southeast of the intersection of Virginia Highways 683 and 663 and 100 yards northwest of Virginia Highway 895, in an area of woodland:

Oe—1 inch to 0; humus, roots, and partly decomposed pine needles.

Ap—0 to 10 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many fine and medium roots; many fine and medium tubular pores; about 10 percent sandstone cobbles; few fine flakes of mica; strongly acid; clear smooth boundary.

Bt1—10 to 19 inches; yellowish brown (10YR 5/4) loam; common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; common fine roots; common fine tubular pores; common faint clay films on faces of peds; about 5 percent sandstone gravel; few fine flakes of mica; very strongly acid; clear smooth boundary.

Bt2—19 to 29 inches; mottled yellowish brown (10YR 5/4), grayish brown (10YR 5/2), and strong brown (7.5YR 5/8) clay loam; moderate medium subangular blocky structure; firm, sticky and plastic; few fine and very fine roots; common fine tubular and irregular pores; many faint grayish brown (10YR 5/2) clay films on faces of peds; few fine flakes of mica; strongly acid; clear wavy boundary.

Cr—29 to 56 inches; yellowish brown (10YR 5/8), partially weathered sandstone that crushes to fine sandy loam; few prominent grayish brown (10YR 5/2) clay flows in cracks; massive; firm; few very fine roots in cracks; gradual wavy boundary.

R—56 inches; hard, yellowish brown sandstone.

The thickness of the solum and the depth to soft bedrock range from 20 to 40 inches. The depth to hard bedrock ranges from 40 to 60 inches. In unlimed areas reaction is extremely acid to strongly acid throughout the profile. The content of sandstone and siltstone fragments ranges from 0 to 15 percent throughout the profile.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is sandy loam or fine sandy loam.

The BA or BE horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 6. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8 and has high- or low-chroma mottles, or it is mottled and does not have a dominant matrix color. It is sandy clay loam, loam, or clay loam.

The BC horizon, if it occurs, has hue of 5YR to 2.5Y, value or 4 to 8, and chroma of 1 to 8. In some pedons it is mottled and does not have dominant matrix color. It is loam, sandy clay loam, or clay loam.

The C horizon, if it occurs, has hue of 5YR to 2.5Y, value of 3 to 8, and chroma of 1 to 8, or it is variegated does not have a dominant matrix color. It is loam, fine sandy loam, or clay loam.

The Cr horizon is weathered bedrock that crushes to loam, sandy loam, or fine sandy loam. It has hue of 2.5YR to 2.5Y, value of 3 to 8, and chroma of 1 to 8, or it is variegated or mottled and does not have a dominant matrix color.

The R horizon is hard Triassic sandstone or siltstone bedrock.

State Series

Soils of the State series are very deep and well drained. They formed in alluvium on low stream terraces. Slope ranges from 0 to 4 percent.

State soils generally are near Bolling, Chenneby, Toccoa, and Wickham soils. State soils have more clay

in the subsoil than Toccoa soils, are less gray in the subsoil than Chenneby and Bolling soils, and have a yellower hue in the subsoil than Wickham soils.

Typical pedon of State sandy loam, 0 to 4 percent slopes, rarely flooded, 300 yards south of the Dan River and 1,900 yards northwest of the intersection of Virginia Highways 863 and 880 at Berry Hill, in a fallow field:

Ap—0 to 9 inches; dark brown (10YR 4/3) sandy loam; weak medium granular structure; very friable, slightly sticky and nonplastic; common fine and few very fine roots; many fine irregular and tubular pores; few medium rounded soft masses of iron and manganese; few fine flakes of mica; strongly acid; abrupt smooth boundary.

Bt1—9 to 16 inches; brown (7.5YR 4/4) sandy clay loam; moderate medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; common fine irregular and tubular pores; many continuous faint brown (7.5YR 4/3) clay films on faces of peds; common medium rounded soft masses of iron and manganese; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—16 to 27 inches; strong brown (7.5YR 5/8) clay loam; common medium distinct yellowish red (5YR 5/8) and common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable, sticky and plastic; common fine irregular and tubular pores; many continuous distinct brown (7.5YR 4/4) clay films on faces of peds; few coarse rounded soft masses of iron and manganese; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—27 to 38 inches; yellowish brown (10YR 5/6) clay loam; many medium distinct yellowish red (5YR 5/8) and many medium distinct light yellowish brown (10YR 6/4) mottles; gray mottles in horizontal bands that are about ¼ inch thick and 1 to 2 inches apart; moderate medium subangular blocky structure; firm, sticky and plastic; common fine irregular and tubular pores; many continuous distinct strong brown (7.5YR 5/6) clay films on faces of peds; few coarse rounded soft masses of iron and manganese; few fine flakes of mica; strongly acid; clear wavy boundary.

BC—38 to 50 inches; strong brown (7.5YR 5/6) sandy loam; many coarse prominent light gray (10YR 7/2) mottles; weak medium subangular blocky structure; firm, sticky and slightly plastic; common fine irregular pores; continuous distinct brown (7.5YR 4/4) clay films on faces of peds; few fine flakes of mica; very strongly acid; clear wavy boundary.

C—50 to 65 inches; brown (7.5YR 4/4) sandy loam; massive; firm, sticky and slightly plastic; few fine irregular pores; few fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 30 to 60 inches. The depth to hard bedrock is more than 60 inches. Gravel makes up 0 to 2 percent of the Ap, Bt, and BC horizons and 0 to 15 percent of the C horizon. Reaction is very strongly acid or strongly acid throughout the profile.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. The E horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. It is sandy loam or fine sandy loam.

Some pedons have a BA or BE horizon. This horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, fine sandy loam, loam, or sandy clay loam.

The Bt horizon generally has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled or has a matrix hue of 2.5Y in the lower part. This horizon commonly is loam, sandy clay loam, or clay loam but is sandy loam or silt loam in some pedons.

The BC horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled. It is sandy loam, fine sandy loam, loam, or sandy clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 2 to 8, or it is mottled and does not have a dominant matrix color. It is commonly stratified and is sand, loamy sand, or sandy loam.

Stoneville Series

Soils of the Stoneville series are deep over soft bedrock and are well drained. They formed in siltstone and shale residuum of Triassic age. They are on uplands. Slope ranges from 2 to 25 percent.

Stoneville soils generally are near Meadows, Mayodan, and Pinkston soils. Stoneville soils are redder in the subsoil than Mayodan, Meadows, and Pinkston soils. They have a solum that is thicker than that of Meadows and Pinkston soils and have more clay in the subsoil than those soils.

Typical pedon of Stoneville silt loam, 2 to 7 percent slopes, 40 yards north of Virginia Highway 691 and 850 yards east of the intersection of Virginia Highways 691 and 690, in a cultivated field:

Ap—0 to 9 inches; dark reddish brown (5YR 3/4) silt loam, reddish brown (5YR 4/4) dry; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and very fine roots; common very fine tubular pores; about 2 percent

quartzite and shale gravel; compact and hard in place; slightly acid; clear smooth boundary.

Bt—9 to 21 inches; dark reddish brown (2.5YR 3/4) clay; moderate fine and medium subangular blocky structure; friable, sticky and plastic; many fine and few medium roots; common fine and very fine tubular pores; common distinct clay films on faces of peds; moderately acid; gradual wavy boundary.

C—21 to 43 inches; dark red (2.5YR 3/4) silt loam saprolite; common pockets of silty clay loam; massive; friable, slightly sticky; few fine and medium roots; common irregular pores; very strongly acid; gradual wavy boundary.

Cr—43 to 65 inches; dark red (2.5YR 3/4), weathered siltstone that crushes to silt loam; massive; firm in place.

The thickness of the clayey Bt horizon ranges from 10 to 30 inches. The depth to soft bedrock ranges from 40 to 60 inches. The content of gravel-sized quartzite, siltstone, mudstone, and shale fragments ranges from 0 to 10 percent throughout the profile. In unlimed areas reaction is very strongly acid to moderately acid.

The A or Ap horizon has hue of 10R to 7.5YR, value of 3 or less, and chroma of 2 to 4. Some pedons have a BA horizon. This horizon has hue of 10R to 5YR, value of 3 or less, and chroma of 2 to 6. It is silt loam.

The Bt horizon has hue of 10R or 2.5YR, value of 3 or less, and chroma of 3 to 6. In some pedons it has few or common fragments of soft, weathered rock. It is clay, silty clay, or silty clay loam.

The C horizon has hue of 10R to 5YR, value of 2 to 4, and chroma of 2 to 6. It is silt loam or loam saprolite.

The Cr horizon has hue of 10R to 5YR, value of 2 to 4, and chroma of 2 to 6. It is weathered siltstone, mudstone, or shale that crushes to silt loam or loam. Some pedons have hard bedrock below a depth of 40 inches.

Tatum Series

Soils of the Tatum series are deep over soft bedrock and are well drained. They formed in residuum of phyllite and schist. They are on uplands. Slope ranges from 2 to 45 percent.

Tatum soils generally are near Goldston soils. Tatum soils have a solum that is thicker than that of Goldston soils and have more clay in the subsoil than those soils. Also, they have a redder hue in the subsoil.

Typical pedon of Tatum gravelly loam, 2 to 7 percent slopes, 400 yards southeast of the junction of Virginia Highways 777 and 908 and 1,865 yards northeast of the junction of Virginia Highways 778 and 605, in a cultivated field:

Ap—0 to 6 inches; brown (7.5YR 4/4) gravelly loam; weak fine granular structure; friable, slightly sticky and slightly plastic; few fine roots; common fine interstitial and tubular pores; common fine flakes of mica; about 20 percent pebbles; strongly acid; clear smooth boundary.

Bt1—6 to 28 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; friable, sticky and plastic; few fine roots; common fine interstitial pores; many faint red (2.5YR 4/8) clay films on faces of peds; common fine flakes of mica; very strongly acid; clear wavy boundary.

Bt2—28 to 36 inches; red (2.5YR 5/8) silty clay loam; weak medium subangular blocky structure; friable, sticky and plastic; few fine interstitial pores; many faint yellowish red (5YR 5/8) clay films on faces of peds; about 2 percent semirounded fine quartzite gravel; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C—36 to 54 inches; brownish yellow (10YR 6/8) and yellowish red (5YR 5/8) silt loam; massive; friable, slightly sticky and slightly plastic; many fine flakes of mica; very strongly acid; gradual wavy boundary.

Cr—54 to 65 inches; brownish yellow (10YR 6/6), weathered bedrock that crushes to loam; massive; firm; many fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 30 to 50 inches. The depth to soft bedrock ranges from 40 to 60 inches. The content of gravel-sized hard rock fragments ranges from 0 to 30 percent throughout the profile. Few or common flakes of mica are throughout the profile. In unlimed areas reaction is very strongly acid or strongly acid throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. Some pedons have an E horizon. This horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 6. It is loam, silt loam, or fine sandy loam in the fine-earth fraction.

The Bt horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is silty clay loam, silty clay, clay loam, or clay in the fine-earth fraction.

The BC horizon, if it occurs, has hue 10R to 5YR, value of 4 to 6, and chroma of 4 to 8. It is silty clay loam or clay loam.

The C horizon is multicolored silt loam or loam.

The Cr horizon is multicolored, weathered phyllite or schist that crushes to silt loam or loam.

Toccoa Series

Soils of the Toccoa series are very deep and well drained. They formed in alluvium on flood plains. Slope ranges from 0 to 2 percent.

Toccoa soils generally are near Chenneby, Riverview, State, and Wehadkee soils and are mapped in complex with Chenneby soils. Toccoa soils have less clay throughout than the nearby soils. They do not have gray mottles in the upper part of the profile, unlike Chenneby and Wehadkee soils.

Typical pedon of Toccoa fine sandy loam, 0 to 2 percent slopes, occasionally flooded, 175 yards southwest of Virginia Highway 880 and 200 yards north of the Dan River, in a fallow field:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium granular structure; friable, slightly sticky and slightly plastic; many fine roots; many fine tubular pores; few fine flakes of mica; moderately acid; gradual smooth boundary.

C1—8 to 24 inches; dark yellowish brown (10YR 4/4) fine sandy loam; massive; friable, slightly sticky and slightly plastic; common fine roots; many fine tubular pores; few fine flakes of mica; moderately acid; clear smooth boundary.

C2—24 to 27 inches; dark brown (10YR 4/3) fine sandy loam; massive; friable, slightly sticky and slightly plastic; few fine roots; many fine tubular pores; few fine flakes of mica; slightly acid; abrupt smooth boundary.

C3—27 to 31 inches; dark brown (10YR 3/3) fine sandy loam; massive; friable, slightly sticky and nonplastic; few fine roots; many fine tubular pores; few fine flakes of mica; slightly acid; abrupt smooth boundary.

Ab—31 to 36 inches; very dark grayish brown (10YR 3/2) loam; massive; friable, slightly sticky and slightly plastic; few fine roots; many fine tubular pores; few fine flakes of mica; slightly acid; abrupt smooth boundary.

Cb1—36 to 45 inches; dark brown (10YR 3/3) loam; massive; friable, slightly sticky and slightly plastic; few fine roots; many fine tubular pores; few fine flakes of mica; slightly acid; gradual wavy boundary.

Cb2—45 to 65 inches; dark brown (10YR 4/3) fine sandy loam; massive; friable, slightly sticky and slightly plastic; many fine tubular pores; few fine flakes of mica; slightly acid.

The depth to bedrock is more than 60 inches. Few or common flakes of mica are throughout the profile. Reaction is strongly acid to slightly acid throughout the profile. At least one subhorizon between depths of 10 and 40 inches is moderately acid or slightly acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It is dominantly sandy loam or fine sandy loam but is loamy sand in some pedons.

The C horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. It is sandy loam, fine sandy loam, or loam.

The Ab horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. It is sandy loam, fine sandy loam, or loam.

The Cb horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. It is sandy loam, fine sandy loam, or loam.

Udorthents

Udorthents are deep or very deep and are well drained. They generally are in areas that have been excavated or filled during construction. Some areas have been filled with a combination of soil and nonsoil material. Udorthents are throughout the survey area. Slope ranges from 0 to 15 percent.

Udorthents generally are near Appling, Cecil, Cullen, Enott, Mayodan, and Mattaponi soils, all of which have a well defined subsoil.

Because of the variability of the Udorthents, a typical pedon is not given. These soils generally are more than 40 inches deep. The subsoil is loamy because most of the clayey material in the subsoil has been mixed with loamy underlying material. Many excavations extend into the underlying weathered parent material. Reaction ranges mainly from very strongly acid to slightly acid, depending on the underlying bedrock or source material.

The surface layer has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. It is sandy loam to clay loam. The thickness of this layer commonly is about 2 to 5 inches, but it ranges from 2 to 10 inches.

The lower layers extend to a depth of more than 40 inches. They have hue of 2.5YR to 10YR, value of 3 to 7, and chroma of 4 to 8 and generally are mottled. They are fine sandy loam to clay loam.

Wehadkee Series

Soils of the Wehadkee series are very deep and poorly drained. They formed in alluvium on flood plains. Slope ranges from 0 to 2 percent.

Wehadkee soils generally are near Bolling, Chenneby, Riverview, and Toccoa soils. Wehadkee soils have more clay throughout than Toccoa soils. They have gray mottles in the subsoil, unlike Riverview soils. They are grayer in the subsoil than Bolling and Chenneby soils.

Typical pedon of Wehadkee silt loam, 0 to 2 percent slopes, frequently flooded, 1,065 yards west of the intersection of Virginia Highways 713 and 714 and 20 yards south of Virginia Highway 714, on the west side of Back Creek, in an area of woodland:

A1—0 to 1 inch; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine and common fine tubular pores; common fine flakes of mica; slightly acid; abrupt smooth boundary.

A2—1 to 6 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure parting to weak fine granular; very friable, slightly sticky and slightly plastic; common fine and few medium roots; many very fine and common fine tubular pores; common fine flakes of mica; slightly acid; clear smooth boundary.

Bg1—6 to 12 inches; grayish brown (2.5Y 5/2) loam; common medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; very friable, slightly sticky and nonplastic; few medium and fine roots; common very fine and few fine tubular pores; common fine flakes of mica; slightly acid; clear smooth boundary.

Bg2—12 to 24 inches; dark grayish brown (2.5Y 4/2) loam; common medium prominent dark gray (N 4/0) mottles; moderate medium subangular blocky structure; very friable, slightly sticky and nonplastic; few fine and few medium roots; common very fine tubular pores; common fine flakes of mica; strongly acid; clear smooth boundary.

Bg3—24 to 31 inches; dark grayish brown (2.5Y 4/2) loam; weak coarse subangular blocky structure; very friable, slightly sticky and nonplastic; few fine and medium roots; common very fine tubular pores; common fine flakes of mica; neutral; clear smooth boundary.

Cg—31 to 65 inches; dark grayish brown (2.5Y 4/2) silt loam; massive; very friable, slightly sticky and nonplastic; few very fine and medium roots; common very fine tubular pores; common fine flakes of mica; neutral.

The thickness of the solum ranges from 30 to more than 60 inches. The depth to hard bedrock is more than 60 inches. Few to many fine flakes of mica are throughout the profile. Reaction ranges from strongly acid to neutral.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. The Bg horizon is neutral in hue or has hue of 10YR to 5Y. It has value of 4 to 6 and chroma of 0 to 2. It is loam, silt loam, silty clay loam, or clay loam. The Cg horizon is neutral in hue or has hue of 10YR to 5Y. It has value of 4 to 7 and chroma of 0 to 2. It generally is stratified and is sand to silty clay loam.

Wickham Series

Soils of the Wickham series are very deep and well drained. They formed in alluvium on gently sloping stream terraces. Slope ranges from 2 to 7 percent.

Wickham soils generally are near Bolling, Hiwassee, and State soils. Wickham soils do not have gray mottles in the upper part of the subsoil, unlike Bolling soils. They have less clay and are less red in the subsoil than Hiwassee soils and are more red in the subsoil than State soils.

Typical pedon of Wickham sandy loam, 2 to 7 percent slopes, 200 yards east of Virginia Highway 817 and 1,500 yards northwest of the junction of Virginia Highways 817 and 819, in a fallow field:

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium granular structure; very friable, slightly sticky and slightly plastic; common fine and few very fine roots; many fine tubular pores; few fine flakes of mica; strongly acid; abrupt smooth boundary.

Bt1—9 to 20 inches; strong brown (7.5YR 4/6) clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; friable, sticky and plastic; common fine roots; common fine tubular pores; common faint strong brown (7.5YR 4/6) clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—20 to 28 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable, sticky and plastic; common fine and very fine roots; common fine irregular pores; many faint yellowish red (5YR 5/8) clay films on faces of peds; few fine flakes of mica; strongly acid; clear wavy boundary.

Bt3—28 to 36 inches; yellowish red (5YR 5/8) clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable, sticky and plastic; few very fine roots; common fine irregular pores; many faint yellowish red (5YR 5/8) clay films on faces of peds; few fine flakes of mica; strongly acid; clear wavy boundary.

BC—36 to 43 inches; yellowish red (5YR 5/8) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine irregular pores; common faint yellowish red (5YR 5/8) clay films on faces of peds; few fine flakes of mica; very strongly acid; clear wavy boundary.

C—43 to 65 inches; strong brown (7.5YR 5/8) gravelly

sandy clay loam; common medium distinct red (2.5YR 4/8) mottles; massive; friable, nonsticky and slightly plastic; few fine irregular pores; few fine flakes of mica; about 30 percent gravel; very strongly acid.

The thickness of the solum ranges from 36 to more than 60 inches. The depth to hard bedrock is more than 60 inches. The content of gravel and cobbles ranges from 5 to 35 percent in the BC and C horizons in some pedons. Reaction is very strongly acid or strongly acid throughout the profile.

The A or Ap horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 2 to 4. Some pedons have an E horizon. This horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is loamy sand, sandy loam, fine sandy loam, or loam.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it has high-chroma mottles in the lower part. This horizon is dominantly sandy loam, loam, sandy clay loam, or clay loam, but in some pedons it has thin layers of clay or sandy clay.

The BC horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. In some pedons it has high-chroma mottles. It is sandy loam, loam, sandy clay loam, or clay loam.

The C horizon has hue of 2.5YR to 10YR, value of 4 to 6, chroma of 6 to 8. It is sand to sandy clay loam in the fine-earth fraction.

Wilkes Series

Soils of the Wilkes series are shallow over soft bedrock and are well drained. They formed in residuum of basic crystalline rocks. They are on uplands. Slope ranges from 7 to 50 percent.

Wilkes soils generally are near Appling, Cecil, Cullen, Enott, Orange, and Poindexter soils. Wilkes soils have a solum that is thinner than that the nearby soils. They do not have gray mottles, unlike Orange soils.

Typical pedon of Wilkes gravelly fine sandy loam, 15 to 25 percent slopes, 730 yards north of the intersection of Virginia Highways 993 and 729 and 130 yards east of Virginia Highway 993, in an area of woodland:

Ap—0 to 8 inches; dark grayish brown (2.5Y 4/2) gravelly fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many fine and common medium roots; many fine tubular pores; about 30 percent fine and medium gravel (hornblende schist); slightly acid; clear smooth boundary.

Bt—8 to 13 inches; strong brown (7.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and few medium roots; many fine tubular pores; many thin clay films on faces of peds; moderately acid; clear wavy boundary.

Cr—13 to 48 inches; partially weathered, dark green hornblende schist that crushes to sandy loam; massive; slightly acid; clear wavy boundary.

R—48 inches; hard hornblende schist bedrock.

The thickness of the solum ranges from 5 to 20 inches. The depth to soft bedrock ranges from 10 to 20 inches. The depth to hard bedrock is more than 40 inches. The content of gravel-sized fragments of quartz and basic rock ranges from 0 to 35 percent throughout the profile. Reaction ranges from strongly acid to slightly acid in the upper part of the profile and from moderately acid to neutral in the lower part.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. Some pedons have an E horizon. This horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. It is fine sandy loam or loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. In many pedons it has few or common mottles and streaks of green, black, gray, or white saprolite. In the fine-earth fraction, it is loam, sandy clay loam, clay loam, or clay.

The Cr horizon is weathered basic crystalline rock that crushes to sandy loam or loam. It is black, green, brown, or gray.

Formation of the Soils

Soil forms through weathering and other processes that act on parent material. The characteristics of the soil at any given point depend on the interaction of parent material, climate, plants and animals, relief, and time.

Climate and plants and animals are the active forces of soil formation. They act on the parent material that has accumulated through the weathering of rocks and slowly change it into a soil. All five factors, however, contribute to the formation of every soil. The relative importance of each differs from place to place. In extreme cases one factor dominates the formation of a soil and determines most of its properties. In general, however, the combined action of all five factors determines the character of the soil.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It is largely responsible for the chemical and mineralogical composition of the soil and the rate of the soil-forming processes. Two kinds of parent material are in the survey area—residuum and alluvium.

The most common residuum is material weathered from acidic igneous and metamorphic rocks, mixed acidic and basic igneous and metamorphic rocks, and sedimentary rocks of Triassic age. Material weathered from acidic igneous and metamorphic rock has the loamy surfaces typical of Appling, Cecil, and Pacolet soils or the siltier surfaces typical of Tatum soils. Material weathered from mixed acidic and basic rocks has the loamy surfaces typical of Cullen, Enott, and Wilkes soils. Material weathered from Triassic sedimentary rocks is coarse grained or fine grained. Creedmoor, Mayodan, and Meadows are examples of soils that formed in this material.

The alluvial material in the survey area is of local origin along the smaller streams and of local and general origin along the major rivers. The soils on the alluvial bottom land in the survey area vary widely in texture and in stage of development. Examples are Chenneby, Toccoa, and Wehadkee soils.

Climate

Precipitation and temperature are the main climatic factors that influence soil formation. Water dissolves minerals, promotes biological activity, and transports mineral and organic residue through the soil. Temperature determines the types of physical, chemical, and biological activities that take place in the soil and the speed at which they act.

Because the amount of precipitation received in this survey area exceeds the amount that is lost through evapotranspiration, the soils have been leached. Much of the soluble material that was originally in the soil or was released through weathering has been removed. Precipitation is mainly responsible for the clayey subsoil that characterizes most of the soils in the survey area. In addition to leaching soluble material, the water that percolates through the soil moves small amounts of clay from the surface layer to the subsoil. Consequently, the soils in the survey area have more clay in the subsoil than in the surface layer.

Plant and Animal Life

Vegetation influences the amount of organic matter in the soil, the color of the surface layer, and to some extent the amount of nutrients. Earthworms, burrowing animals, and other animals help to keep the soil open and porous. Micro-organisms decompose the vegetation and dead animal matter, thus releasing plant nutrients. The native vegetation in the survey area consisted mainly of hardwoods. The soils that formed under this vegetation are generally less acid than those that formed under coniferous vegetation.

Human activities have affected soil formation. They include clearing of the forests, cultivation, the introduction of new plants, and measures that change natural drainage. Mixing the upper layers of the soil has resulted in the formation of a plow layer, cultivating strongly sloping soils has accelerated erosion, and applying lime and fertilizer has changed the content of plant nutrients, especially in the upper layers of the soil.

Relief

The relief of an area is largely determined by the underlying geologic formations, the geologic history of the general region, and the effects of dissection by rivers and streams. Relief influences soil formation through its effects on moisture in the soil, erosion, temperature, and plant cover.

Most of the soils on uplands in this survey area are naturally well drained. The soils on terraces and flood plains range from well drained to poorly drained. Soil drainage is commonly related to the position of the soil on the landscape. Soils in low, nearly level areas, for example, commonly are poorly drained, whereas soils in the more sloping areas typically are well drained.

Time

The degree of horizon differentiation within the soil is related to the amount of time that the soil has been subject to the other soil-forming factors. A soil that is characterized by little or no horizon development is considered young, whereas one that has strongly developed horizons is considered old.

The oldest soils in the survey area are mainly those that formed in residuum. Examples are Appling and Cecil soils. In general, these soils are in the less sloping, relatively stable landscape positions. They formed in easily weatherable material and are characterized by a strong degree of horizon differentiation. Soils that formed in recent alluvium, such as Toccoa soils, have been in place only a relatively short time and show little or no evidence of soil formation other than an accumulation of organic matter in the surface layer. Soils on terraces, such as State and Wickham soils, are generally intermediate in degree of development between the old residual soils and the very young alluvial soils.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less

than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious.

Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand.

A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage.

Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has

properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace;

land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1956-85 at Danville, Virginia)

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average daily	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days*	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	46.3	25.1	35.7	72	4	64	3.33	4.39	1.92	7	4.6
February----	51.2	28.3	39.8	76	10	96	3.63	4.65	2.63	7	1.8
March-------	60.6	35.2	47.9	85	20	259	3.83	4.95	2.33	8	1.3
April-------	71.6	44.3	58.0	91	27	536	3.34	4.96	2.08	6	.0
May---------	79.4	53.8	66.6	94	35	816	3.58	4.30	2.48	7	.0
June--------	86.1	62.0	74.1	98	46	1,012	3.51	5.01	2.22	6	.0
July--------	89.0	65.9	77.5	99	54	1,155	4.27	5.67	2.78	8	.0
August------	88.4	65.5	77.0	100	53	1,135	4.05	5.29	2.45	7	.0
September---	82.4	58.4	70.4	96	42	906	3.54	5.06	1.43	5	.0
October-----	71.5	45.9	58.7	88	28	568	3.44	4.82	1.68	6	.0
November----	61.5	36.7	49.1	81	19	284	2.97	4.20	1.53	6	.1
December----	50.4	28.9	39.7	75	10	111	3.41	4.75	1.57	6	1.0
Yearly:											
Average---	70.4	46.4	58.4	---	---	---	---	---	---	---	---
Extreme---	---	---	---	103	-5	---	---	---	---	---	---
Total-----	---	---	---	---	---	6,442	42.90	58.05	25.10	79	8.8

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1956-85 at Danville, Virginia)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 29	Apr. 9	May 2
2 years in 10 later than--	Mar. 25	Apr. 2	Apr. 22
5 years in 10 later than--	Mar. 11	Mar. 21	Apr. 9
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 9	Oct. 27	Oct. 18
2 years in 10 earlier than--	Nov. 17	Oct. 31	Oct. 18
5 years in 10 earlier than--	Nov. 27	Nov. 14	Oct. 29

TABLE 3.--GROWING SEASON

(Recorded in the period 1956-85 at Danville, Virginia)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	231	211	179
8 years in 10	236	218	185
5 years in 10	258	234	200
2 years in 10	271	247	216
1 year in 10	284	251	222

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Pittsylvania County	City of Danville	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
1B	Appling sandy loam, 2 to 7 percent slopes	20,769	147	20,916	3.2
1C	Appling sandy loam, 7 to 15 percent slopes	21,031	145	21,176	3.2
2C	Ashlar fine sandy loam, 7 to 15 percent slopes	1,842	0	1,842	0.3
2D	Ashlar fine sandy loam, 15 to 35 percent slopes	3,125	0	3,125	0.5
2E	Ashlar fine sandy loam, 35 to 50 percent slopes	1,542	0	1,542	0.2
3A	Bolling fine sandy loam, 0 to 2 percent slopes, rarely flooded	379	0	379	0.1
3B	Bolling fine sandy loam, 2 to 7 percent slopes	446	0	446	0.1
4B	Cecil sandy loam, 2 to 7 percent slopes	38,990	171	39,161	6.0
4C	Cecil sandy loam, 7 to 15 percent slopes	24,168	45	24,213	3.7
5B3	Cecil sandy clay loam, 2 to 7 percent slopes, severely eroded	74,522	552	75,074	11.5
5C3	Cecil sandy clay loam, 7 to 15 percent slopes, severely eroded	86,070	449	86,519	13.2
6B	Cecil-Urban land complex, 2 to 7 percent slopes	1,108	2,381	3,489	0.5
6C	Cecil-Urban land complex, 7 to 20 percent slopes	373	2,046	2,419	0.4
7A	Chenneby loam, 0 to 2 percent slopes, occasionally flooded	3,602	40	3,642	0.6
8A	Chenneby-Toccoa complex, 0 to 2 percent slopes, frequently flooded	21,850	55	21,905	3.3
9B	Creedmoor fine sandy loam, 2 to 7 percent slopes	10,739	0	10,739	1.6
9C	Creedmoor fine sandy loam, 7 to 15 percent slopes	1,582	0	1,582	0.2
10B	Cullen loam, 2 to 7 percent slopes	2,942	0	2,942	0.4
11B3	Cullen clay loam, 2 to 7 percent slopes, severely eroded	8,539	0	8,539	1.3
11C3	Cullen clay loam, 7 to 15 percent slopes, severely eroded	12,585	0	12,585	1.9
12B	Enott fine sandy loam, 2 to 7 percent slopes	4,427	50	4,477	0.7
12C	Enott fine sandy loam, 7 to 15 percent slopes	4,030	100	4,130	0.6
12D	Enott fine sandy loam, 15 to 25 percent slopes	536	0	536	0.1
13D	Goldston very channery silt loam, 15 to 35 percent slopes	880	0	880	0.1
14C	Goldston-Tatum complex, 7 to 15 percent slopes	399	0	399	0.1
15E	Goldston-Rock outcrop complex, 35 to 60 percent slopes	2,382	0	2,382	0.4
16B	Helena sandy loam, 2 to 7 percent slopes	1,598	0	1,598	0.2
16C	Helena sandy loam, 7 to 15 percent slopes	424	0	424	0.1
17B	Hiwassee loam, 2 to 7 percent slopes	1,653	0	1,653	0.3
18B3	Hiwassee clay loam, 2 to 7 percent slopes, severely eroded	2,113	45	2,158	0.3
18C3	Hiwassee clay loam, 7 to 15 percent slopes, severely eroded	2,686	0	2,686	0.4
19B	Hiwassee cobbly sandy loam, 2 to 7 percent slopes	356	0	356	0.1
19C	Hiwassee cobbly sandy loam, 7 to 15 percent slopes	280	0	280	*
20B	Leaksville silt loam, 0 to 4 percent slopes	1,107	0	1,107	0.2
21D	Madison fine sandy loam, 15 to 25 percent slopes	78,924	0	78,924	12.0
21E	Madison fine sandy loam, 25 to 45 percent slopes	17,777	0	17,777	2.7
22B	Mattaponi sandy loam, 2 to 7 percent slopes	3,669	35	3,704	0.6
22C	Mattaponi sandy loam, 7 to 15 percent slopes	1,389	0	1,389	0.2
23B	Mayodan fine sandy loam, 2 to 7 percent slopes	26,086	0	26,086	4.0
23C	Mayodan fine sandy loam, 7 to 15 percent slopes	24,092	0	24,092	3.7
23D	Mayodan fine sandy loam, 15 to 25 percent slopes	6,291	0	6,291	1.0
24B	Meadows gravelly loam, 2 to 7 percent slopes	4,795	0	4,795	0.7
24C	Meadows gravelly loam, 7 to 15 percent slopes	1,703	0	1,703	0.3
25B	Orange loam, 0 to 4 percent slopes	1,152	0	1,152	0.2
26B	Pacolet fine sandy loam, 2 to 7 percent slopes	11,547	0	11,547	1.8
26D	Pacolet fine sandy loam, 15 to 25 percent slopes	37,933	2,088	40,021	6.1
26E	Pacolet fine sandy loam, 25 to 45 percent slopes	3,844	500	4,344	0.7
27C3	Pacolet sandy clay loam, 7 to 15 percent slopes, severely eroded	17,047	0	17,047	2.6
28C	Pinkston cobbly sandy loam, 7 to 15 percent slopes	2,764	0	2,764	0.4
28D	Pinkston cobbly sandy loam, 15 to 35 percent slopes	1,567	0	1,567	0.2
29C	Pinkston-Mayodan complex, 7 to 15 percent slopes, very stony	1,867	0	1,867	0.3
29D	Pinkston-Mayodan complex, 15 to 35 percent slopes, very stony	2,547	0	2,547	0.4
29E	Pinkston-Mayodan complex, 35 to 50 percent slopes, very stony	1,644	0	1,644	0.3
30	Pits, quarry	72	0	72	*
31C	Poindexter fine sandy loam, 7 to 15 percent slopes	994	0	994	0.2

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Pittsylvania County	City of Danville	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
31D	Poindexter fine sandy loam, 15 to 25 percent slopes	2,853	0	2,853	0.4
32C	Rion fine sandy loam, 7 to 15 percent slopes	3,092	200	3,292	0.5
33A	Riverview silt loam, 0 to 2 percent slopes, occasionally flooded	1,038	0	1,038	0.2
34B	Sheva fine sandy loam, 2 to 7 percent slopes	3,601	0	3,601	0.6
34C	Sheva fine sandy loam, 7 to 15 percent slopes	1,235	0	1,235	0.2
35B	State sandy loam, 0 to 4 percent slopes, rarely flooded	612	0	612	0.1
36B	Stoneville silt loam, 2 to 7 percent slopes	1,570	0	1,570	0.2
36C	Stoneville silt loam, 7 to 15 percent slopes	1,021	0	1,021	0.2
36D	Stoneville silt loam, 15 to 25 percent slopes	221	0	221	*
37B	Tatum gravelly loam, 2 to 7 percent slopes	1,370	0	1,370	0.2
37C	Tatum gravelly loam, 7 to 15 percent slopes	1,367	0	1,367	0.2
37D	Tatum gravelly loam, 15 to 25 percent slopes	1,979	0	1,979	0.3
37E	Tatum gravelly loam, 25 to 45 percent slopes	1,061	0	1,061	0.2
38A	Toccoa fine sandy loam, 0 to 2 percent slopes, occasionally flooded	3,250	75	3,325	0.5
39	Udorthents, loamy	1,190	925	2,115	0.3
40	Urban land	903	944	1,847	0.3
41A	Wehadkee silt loam, 0 to 2 percent slopes, frequently flooded	1,723	0	1,723	0.3
42B	Wickham sandy loam, 2 to 7 percent slopes	313	0	313	*
43C	Wilkes gravelly fine sandy loam, 7 to 15 percent slopes	1,580	7	1,587	0.2
43D	Wilkes gravelly fine sandy loam, 15 to 25 percent slopes	2,658	0	2,658	0.4
43E	Wilkes gravelly fine sandy loam, 25 to 50 percent slopes	884	0	884	0.1
	Water	2,900	0	2,900	0.4
	Total	643,200	11,000	654,200	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
1B	Appling sandy loam, 2 to 7 percent slopes
3A	Bolling fine sandy loam, 0 to 2 percent slopes, rarely flooded
3B	Bolling fine sandy loam, 2 to 7 percent slopes
4B	Cecil sandy loam, 2 to 7 percent slopes
10B	Cullen loam, 2 to 7 percent slopes
16B	Helena sandy loam, 2 to 7 percent slopes
17B	Hiwassee loam, 2 to 7 percent slopes
22B	Mattaponi sandy loam, 2 to 7 percent slopes
23B	Mayodan fine sandy loam, 2 to 7 percent slopes
26B	Pacolet fine sandy loam, 2 to 7 percent slopes
33A	Riverview silt loam, 0 to 2 percent slopes, occasionally flooded
36B	Stoneville silt loam, 2 to 7 percent slopes
38A	Toccoa fine sandy loam, 0 to 2 percent slopes, occasionally flooded

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Soybeans	Corn	Corn silage	Tobacco	Grass-legume hay	Wheat	Pasture
		Bu	Bu	Tons	Lbs	Tons	Bu	AUM*
1B-------------- Appling	IIe	35	85	17	2,100	4.0	45	8.0
1C-------------- Appling	IIIe	25	75	15	1,900	3.6	35	7.0
2C-------------- Ashlar	IIIe	20	65	13	1,500	2.0	30	5.0
2D-------------- Ashlar	VIe	---	---	---	---	---	---	3.0
2E-------------- Ashlar	VIIe	---	---	---	---	---	---	3.0
3A-------------- Bolling	IIw	40	120	24	2,200	5.0	60	9.0
3B-------------- Bolling	IIe	40	105	21	2,200	4.5	60	8.5
4B-------------- Cecil	IIe	35	85	17	2,400	4.2	50	8.0
4C-------------- Cecil	IIIe	25	75	15	2,200	3.8	45	7.0
5B3------------- Cecil	IIIe	25	70	14	2,200	4.0	45	5.5
5C3------------- Cecil	IVe	20	60	12	2,000	3.6	40	4.5
6B**. Cecil-Urban land								
6C**. Cecil-Urban land								
7A-------------- Chenneby	IIw	35	100	20	---	6.0	40	10.0
8A**:								
Chenneby-------	VIw	---	---	---	---	---	---	---
Toccoa---------	IIw	---	---	---	---	---	---	---
9B-------------- Creedmoor	IIe	30	75	15	2,200	3.5	45	6.5
9C-------------- Creedmoor	IIIe	25	60	12	2,000	3.0	35	6.0
10B------------- Cullen	IIe	45	110	22	---	4.5	60	9.1

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Soybeans	Corn	Corn silage	Tobacco	Grass-legume hay	Wheat	Pasture
		Bu	Bu	Tons	Lbs	Tons	Bu	AUM*
11B3------------ Cullen	IIIe	35	90	18	---	4.0	45	8.3
11C3------------ Cullen	IVe	25	70	14	---	3.5	40	7.6
12B------------- Enott	IIe	35	95	19	2,100	4.8	45	8.5
12C------------- Enott	IIIe	25	80	16	1,800	4.5	35	8.0
12D------------- Enott	IVe	---	---	---	---	4.2	---	7.5
13D------------- Goldston	VIIs	---	---	---	---	---	---	3.0
14C**:								
Goldston--------	VIs	---	---	---	---	---	---	---
Tatum-----------	IIIe	---	---	---	---	---	---	---
15E**----------- Goldston-Rock outcrop	VIIe	---	---	---	---	---	---	---
16B------------- Helena	IIe	30	80	16	2,100	3.5	40	5.8
16C------------- Helena	IIIe	25	70	14	1,800	3.2	30	5.3
17B------------- Hiwassee	IIe	40	95	19	---	3.9	55	6.5
18B3------------ Hiwassee	IIIe	35	75	15	---	3.3	45	5.5
18C3------------ Hiwassee	IVe	30	70	14	---	3.0	35	5.0
19B------------- Hiwassee	IIIs	35	85	17	---	3.9	45	6.5
19C------------- Hiwassee	IVs	30	75	15	---	3.6	40	6.0
20B------------- Leaksville	IVw	30	65	13	---	3.5	40	6.0
21D------------- Madison	IVe	---	---	---	---	3.6	---	6.0
21E------------- Madison	VIIe	---	---	---	---	3.6	---	5.5
22B------------- Mattaponi	IIe	30	95	19	2,300	3.5	45	6.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Soybeans	Corn	Corn silage	Tobacco	Grass-legume hay	Wheat	Pasture
		Bu	Bu	Tons	Lbs	Tons	Bu	AUM*
22C------------- Mattaponi	IIIe	25	85	17	2,100	3.0	40	5.5
23B------------- Mayodan	IIe	35	80	16	2,100	4.8	45	8.0
23C------------- Mayodan	IIIe	30	75	15	2,000	4.5	40	7.5
23D------------- Mayodan	IVe	---	---	---	---	4.2	---	7.0
24B------------- Meadows	IIIs	10	25	5	---	2.5	15	5.0
24C------------- Meadows	IVs	5	15	3	---	2.0	5	4.5
25B------------- Orange	IIw	25	80	16	---	3.0	40	6.5
26B------------- Pacolet	IIe	35	80	16	2,200	4.8	45	8.0
26D------------- Pacolet	IVe	---	---	---	---	3.0	---	5.0
26E------------- Pacolet	VIIe	---	---	---	---	2.5	---	4.5
27C3------------ Pacolet	IVe	30	65	13	2,000	3.5	35	5.5
28C------------- Pinkston	IVs	---	---	---	---	2.0	---	3.5
28D------------- Pinkston	VIIs	---	---	---	---	---	---	---
29C**----------- Pinkston- Mayodan	VIIs	---	---	---	---	---	---	4.6
29D**----------- Pinkston- Mayodan	VIIs	---	---	---	---	---	---	---
29E**----------- Pinkston- Mayodan	VIIe	---	---	---	---	---	---	---
30**. Pits, quarry								
31C------------- Poindexter	IIIe	15	50	10	1,800	4.0	35	6.5
31D------------- Poindexter	IVe	---	---	---	---	3.8	---	6.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Soybeans	Corn	Corn silage	Tobacco	Grass-legume hay	Wheat	Pasture
		Bu	Bu	Tons	Lbs	Tons	Bu	AUM*
32C------------- Rion	IIIe	30	75	15	2,100	4.0	40	6.5
33A------------- Riverview	I	45	140	28	---	5.0	60	8.0
34B------------- Sheva	IIe	25	75	15	2,200	3.5	50	6.0
34C------------- Sheva	IIIe	25	60	12	2,000	3.0	40	5.8
35B------------- State	IIe	40	120	24	---	5.1	60	7.0
36B------------- Stoneville	IIe	35	75	15	1,800	5.0	50	8.0
36C------------- Stoneville	IIIe	30	60	12	1,600	4.5	40	7.0
36D------------- Stoneville	IVe	---	---	---	---	4.0	---	6.0
37B------------- Tatum	IIe	35	60	12	2,400	4.2	45	8.0
37C------------- Tatum	IIIe	30	55	11	2,000	3.8	40	7.5
37D------------- Tatum	IVe	---	---	---	---	2.5	---	7.0
37E------------- Tatum	VIIe	---	---	---	---	---	---	---
38A------------- Toccoa	I	35	90	18	---	4.0	40	6.5
39**. Udorthents								
40**. Urban land								
41A------------- Wehadkee	VIw	---	---	---	---	4.8	---	8.5
42B------------- Wickham	IIe	40	115	23	2,200	4.5	60	7.0
43C------------- Wilkes	VIs	15	50	10	---	2.5	35	5.0
43D------------- Wilkes	VIe	---	---	---	---	2.0	---	4.5
43E------------- Wilkes	VIIe	---	---	---	---	2.0	---	4.5

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
1B, 1C----------Appling	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	84	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	65	7	
						Virginia pine-------	74	8	
						Scarlet oak---------	74	4	
						White oak-----------	64	3	
						Yellow-poplar-------	88	6	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
						Hickory-------------	---	---	
2C--------------Ashlar	8S	Slight	Slight	Slight	Moderate	Loblolly pine-------	85	8	Loblolly pine, eastern white pine, shortleaf pine.
						Shortleaf pine------	70	8	
						Virginia pine-------	70	8	
						Northern red oak----	60	3	
2D--------------Ashlar	8R	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	85	8	Loblolly pine, eastern white pine, shortleaf pine.
						Shortleaf pine------	70	8	
						Virginia pine-------	70	8	
						Northern red oak----	60	3	
2E--------------Ashlar	8R	Severe	Severe	Slight	Moderate	Loblolly pine-------	85	8	Loblolly pine, eastern white pine, shortleaf pine.
						Shortleaf pine------	70	8	
						Virginia pine-------	70	8	
						Northern red oak----	60	3	
3A, 3B----------Bolling	9W	Slight	Moderate	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine, yellow-poplar, black walnut.
						Virginia pine-------	80	8	
						Shortleaf pine------	80	9	
						Yellow-poplar-------	90	6	
4B, 4C----------Cecil	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	83	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	69	8	
						Virginia pine-------	71	8	
						White oak-----------	79	4	
						Northern red oak----	81	4	
						Southern red oak----	79	4	
						Post oak------------	72	4	
						Scarlet oak---------	81	4	
						Sweetgum------------	76	5	
						Yellow-poplar-------	92	6	
5B3, 5C3--------Cecil	7C	Slight	Moderate	Moderate	Slight	Loblolly pine-------	72	7	Loblolly pine, shortleaf pine.
						Shortleaf pine------	63	7	
						Virginia pine-------	65	7	
						White oak-----------	64	3	
						Northern red oak----	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
6B**, 6C**:									
Cecil----------	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	83	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	69	8	
						Virginia pine-------	71	8	
						White oak-----------	79	4	
						Northern red oak----	81	4	
						Southern red oak----	79	4	
						Post oak------------	72	4	
						Scarlet oak---------	81	4	
						Sweetgum------------	76	5	
						Yellow-poplar-------	92	6	
Urban land.									
7A-------------- Chenneby	11W	Slight	Moderate	Moderate	Slight	Loblolly pine-------	100	11	Loblolly pine, yellow-poplar, sweetgum, water oak, American sycamore.
						Sweetgum------------	100	10	
						Water oak-----------	100	7	
						Yellow-poplar-------	100	9	
						American sycamore---	100	11	
8A**:									
Chenneby-------	11W	Slight	Moderate	Moderate	Slight	Loblolly pine-------	100	11	Loblolly pine, yellow-poplar, sweetgum, water oak, American sycamore.
						Sweetgum------------	100	10	
						Water oak-----------	100	7	
						Yellow-poplar-------	100	9	
						American sycamore---	100	11	
Toccoa---------	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine, yellow-poplar, American sycamore, cherrybark oak.
						Yellow-poplar-------	107	8	
						Sweetgum------------	100	10	
						Southern red oak----	---	---	
9B, 9C---------- Creedmoor	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	87	9	Loblolly pine.
						Yellow-poplar-------	97	7	
						Virginia pine-------	64	7	
						Shortleaf pine------	---	---	
						Sweetgum------------	---	---	
						Water oak-----------	---	---	
						Red maple-----------	---	---	
						Red maple-----------	---	---	
10B, 11B3, 11C3- Cullen	8A	Slight	Moderate	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, eastern white pine.
						Shortleaf pine------	70	8	
						Yellow-poplar-------	80	5	
						Northern red oak----	70	4	
12B, 12C-------- Enott	7A	Slight	Slight	Slight	Slight	Loblolly pine-------	73	7	Loblolly pine.
						Shortleaf pine------	63	7	
						Sweetgum------------	87	7	
						Yellow-poplar-------	88	6	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
12D------------- Enott	7R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	73	7	Loblolly pine.
						Shortleaf pine------	63	7	
						Sweetgum------------	87	7	
						Yellow-poplar-------	88	6	
13D------------- Goldston	7D	Moderate	Moderate	Moderate	Severe	Loblolly pine-------	76	7	Loblolly pine.
						Shortleaf pine------	68	7	
						Southern red oak----	66	3	
						White oak-----------	69	4	
						Post oak------------	---	---	
						Hickory-------------	---	---	
						Virginia pine-------	---	---	
						Red maple-----------	---	---	
14C**:									
Goldston-------	7D	Slight	Slight	Moderate	Severe	Loblolly pine-------	76	7	Loblolly pine.
						Shortleaf pine------	68	7	
						Southern red oak----	66	3	
						White oak-----------	69	4	
						Post oak------------	---	---	
						Hickory-------------	---	---	
						Virginia pine-------	---	---	
						Red maple-----------	---	---	
Tatum----------	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	78	8	Loblolly pine, eastern white pine, yellow-poplar.
						Northern red oak----	72	4	
						Virginia pine-------	68	7	
15E**:									
Goldston-------	7R	Severe	Severe	Moderate	Severe	Loblolly pine-------	76	7	Loblolly pine.
						Shortleaf pine------	68	7	
						Southern red oak----	66	3	
						White oak-----------	69	4	
						Post oak------------	---	---	
						Hickory-------------	---	---	
						Virginia pine-------	---	---	
						Red maple-----------	---	---	
Rock outcrop.									
16B, 16C-------- Helena	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	84	8	Loblolly pine, yellow-poplar.
						Shortleaf pine------	66	7	
						White oak-----------	---	---	
						Yellow-poplar-------	---	---	
						Sweetgum------------	---	---	
						Northern red oak----	---	---	
						Southern red oak----	---	---	
						Black oak-----------	---	---	
						Hickory-------------	---	---	
						Virginia pine-------	---	---	
						Willow oak----------	---	---	
						American elm--------	---	---	
17B------------- Hiwassee	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	85	8	Loblolly pine, shortleaf pine.
						Northern red oak----	80	4	
						Shortleaf pine------	75	8	
						Southern red oak----	80	4	
						White oak-----------	80	4	
						Yellow-poplar-------	85	6	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
18B3, 18C3------ Hiwassee	7C	Slight	Moderate	Moderate	Slight	Loblolly pine-------	71	7	Loblolly pine, shortleaf pine.
						Shortleaf pine------	68	7	
						Northern red oak----	75	4	
						White oak-----------	70	4	
						Southern red oak----	75	4	
19B, 19C-------- Hiwassee	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	85	8	Loblolly pine, shortleaf pine.
						Northern red oak----	80	4	
						White oak-----------	80	4	
						Yellow-poplar-------	85	6	
						Shortleaf pine------	75	8	
						Southern red oak----	80	4	
20B------------- Leaksville	7W	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	75	7	Shortleaf pine.
						Willow oak----------	60	3	
						Shortleaf pine------	---	---	
						White oak-----------	---	---	
						Green ash-----------	---	---	
						Shagbark hickory----	---	---	
						Virginia pine-------	---	---	
21D------------- Madison	8R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	64	7	
						Southern red oak----	75	4	
						Yellow-poplar-------	96	7	
						Virginia pine-------	71	8	
						Northern red oak----	75	4	
						White oak-----------	75	4	
21E------------- Madison	8R	Severe	Severe	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	64	7	
						Southern red oak----	75	4	
						Yellow-poplar-------	96	7	
						Virginia pine-------	71	8	
						Northern red oak----	75	4	
						White oak-----------	75	4	
22B, 22C-------- Mattaponi	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, shortleaf pine.
						White oak-----------	70	4	
						Virginia pine-------	70	8	
						Sweetgum------------	76	5	
23B, 23C-------- Mayodan	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	87	9	Loblolly pine.
						Shortleaf pine------	70	8	
						Virginia pine-------	60	6	
						White oak-----------	54	3	
						Yellow-poplar-------	---	---	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
						Black oak-----------	---	---	
						Hickory-------------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
23D------------- Mayodan	9R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	87	9	Loblolly pine.
						Shortleaf pine------	70	8	
						Virginia pine-------	60	6	
						White oak-----------	54	3	
						Yellow-poplar-------	---	---	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
						Black oak-----------	---	---	
						Hickory-------------	---	---	
24B, 24C-------- Meadows	8D	Slight	Slight	Moderate	Severe	Loblolly pine-------	70	6	Loblolly pine, eastern white pine.
						Virginia pine-------	60	6	
						Northern red oak----	60	3	
25B------------- Orange	7W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	75	7	Loblolly pine.
						Northern red oak----	60	3	
						Virginia pine-------	60	6	
						Shortleaf pine------	60	6	
26B------------- Pacolet	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	78	8	Loblolly pine, shortleaf pine, yellow-poplar, eastern white pine.
						Shortleaf pine------	70	8	
						Yellow-poplar-------	90	6	
						Virginia pine-------	---	---	
						Northern red oak----	---	---	
						Hickory-------------	---	---	
						White oak-----------	---	---	
26D------------- Pacolet	8A	Moderate	Moderate	Slight	Slight	Loblolly pine-------	78	8	Loblolly pine, shortleaf pine, yellow-poplar, eastern white pine.
						Shortleaf pine------	70	8	
						Yellow-poplar-------	90	6	
						Virginia pine-------	---	---	
						Northern red oak----	---	---	
						Hickory-------------	---	---	
						White oak-----------	---	---	
26E------------- Pacolet	8R	Severe	Severe	Slight	Slight	Loblolly pine-------	78	8	Loblolly pine, shortleaf pine, yellow-poplar, eastern white pine.
						Shortleaf pine------	70	8	
						Yellow-poplar-------	90	6	
						Virginia pine-------	---	---	
						Northern red oak----	---	---	
						Hickory-------------	---	---	
						White oak-----------	---	---	
27C3------------ Pacolet	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	78	8	Loblolly pine, shortleaf pine, yellow-poplar, eastern white pine.
						Shortleaf pine------	70	8	
						Yellow-poplar-------	90	6	
						Virginia pine-------	---	---	
						Northern red oak----	---	---	
						Hickory-------------	---	---	
						White oak-----------	---	---	
28C------------- Pinkston	6X	Slight	Slight	Moderate	Severe	Loblolly pine-------	70	6	Loblolly pine.
						Southern red oak----	60	3	
						Virginia pine-------	60	6	
28D------------- Pinkston	6R	Moderate	Moderate	Moderate	Severe	Loblolly pine-------	70	6	Loblolly pine.
						Southern red oak----	60	3	
						Virginia pine-------	60	6	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
29C**:									
Pinkston	6X	Slight	Moderate	Moderate	Severe	Loblolly pine	70	6	Loblolly pine.
						Southern red oak	60	3	
						Virginia pine	60	6	
Mayodan	8X	Slight	Moderate	Moderate	Slight	Loblolly pine	80	8	Loblolly pine, Virginia pine.
						Virginia pine	---	---	
						Yellow-poplar	---	---	
						Southern red oak	---	---	
29D**:									
Pinkston	6R	Moderate	Moderate	Moderate	Severe	Loblolly pine	70	6	Loblolly pine.
						Southern red oak	60	3	
						Virginia pine	60	6	
Mayodan	8R	Severe	Severe	Moderate	Slight	Loblolly pine	80	8	Loblolly pine, Virginia pine.
						Virginia pine	---	---	
						Yellow-poplar	---	---	
						Southern red oak	---	---	
29E**:									
Pinkston	6R	Severe	Severe	Moderate	Severe	Loblolly pine	70	6	Loblolly pine.
						Southern red oak	60	3	
						Virginia pine	60	6	
Mayodan	8R	Severe	Severe	Moderate	Slight	Loblolly pine	80	8	Loblolly pine, Virginia pine.
						Virginia pine	---	---	
						Yellow-poplar	---	---	
						Southern red oak	---	---	
31C Poindexter	6A	Slight	Slight	Slight	Slight	Loblolly pine	70	6	Loblolly pine, shortleaf pine.
						Shortleaf pine	60	6	
						Virginia pine	65	7	
						Southern red oak	60	3	
31D Poindexter	6R	Moderate	Moderate	Slight	Slight	Loblolly pine	70	6	Loblolly pine, shortleaf pine.
						Shortleaf pine	60	6	
						Virginia pine	65	7	
						Southern red oak	60	3	
32C Rion	8A	Slight	Slight	Slight	Slight	Loblolly pine	80	8	Loblolly pine, shortleaf pine, yellow-poplar.
						Post oak	65	3	
						Shortleaf pine	70	8	
						Southern red oak	80	4	
						Sweetgum	80	6	
						White oak	70	4	
						Yellow-poplar	90	6	
33A Riverview	11A	Slight	Slight	Slight	Slight	Loblolly pine	100	11	Loblolly pine, slash pine, eastern cottonwood, sweetgum, yellow-poplar, American sycamore.
						Yellow-poplar	110	9	
						Sweetgum	100	10	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
34B, 34C-------- Sheva	6W	Slight	Slight	Slight	Moderate	Loblolly pine------- Shortleaf pine------ Virginia pine-------	65 60 ---	6 6 ---	Loblolly pine, yellow-poplar.
35B------------- State	9A	Slight	Slight	Slight	Slight	Loblolly pine------- Southern red oak---- Yellow-poplar------- Virginia pine------- Hickory------------- American beech------ White oak-----------	86 85 100 85 --- --- ---	9 5 8 9 --- --- ---	Loblolly pine, black walnut, yellow-poplar.
36B, 36C-------- Stoneville	7A	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Virginia pine------- White oak----------- Chestnut oak-------- Scarlet oak--------- Yellow-poplar------- Sweetgum------------	75 59 63 79 76 76 --- ---	7 6 7 4 4 4 --- ---	Shortleaf pine, loblolly pine.
36D------------- Stoneville	7R	Moderate	Moderate	Slight	Slight	Loblolly pine------- Shortleaf pine------ Virginia pine------- White oak----------- Chestnut oak-------- Scarlet oak--------- Yellow-poplar------- Sweetgum------------	75 59 63 79 76 76 --- ---	7 6 7 4 4 4 --- ---	Shortleaf pine, loblolly pine.
37B, 37C-------- Tatum	8A	Slight	Slight	Slight	Slight	Loblolly pine------- Northern red oak---- Virginia pine-------	78 72 68	8 4 7	Loblolly pine, eastern white pine, yellow-poplar.
37D------------- Tatum	8R	Moderate	Moderate	Slight	Slight	Loblolly pine------- Yellow-poplar------- White oak----------- Chestnut oak-------- Virginia pine-------	78 83 65 65 68	8 5 3 3 7	---
37E------------- Tatum	8R	Severe	Severe	Slight	Slight	Loblolly pine------- Yellow-poplar------- White oak----------- Chestnut oak-------- Virginia pine-------	78 83 65 65 68	8 5 3 3 7	---
38A------------- Toccoa	9A	Slight	Slight	Slight	Slight	Loblolly pine------- Yellow-poplar------- Sweetgum------------ Southern red oak----	90 107 100 ---	9 8 10 ---	Loblolly pine, yellow-poplar, American sycamore, cherrybark oak.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
41A------------- Wehadkee	10W	Slight	Severe	Moderate	Moderate	Loblolly pine-------	93	10	Yellow-poplar, loblolly pine, green ash, sweetgum.
						Yellow-poplar-------	100	8	
						Sweetgum------------	94	8	
						Willow oak----------	110	8	
						Water oak-----------	91	6	
						Green ash-----------	---	---	
						White ash-----------	---	---	
						American sycamore---	---	---	
						River birch---------	---	---	
42B------------- Wickham	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine.
						Yellow-poplar-------	89	6	
						White oak-----------	84	5	
						Southern red oak----	82	4	
						Sweetgum------------	---	---	
						Red maple-----------	---	---	
						Northern red oak----	---	---	
						Water oak-----------	---	---	
						Hickory-------------	---	---	
						Shortleaf pine------	---	---	
43C------------- Wilkes	7D	Slight	Slight	Slight	--------	Loblolly pine-------	75	7	Loblolly pine, Virginia pine.
						Post oak------------	79	4	
						Shortleaf pine------	63	7	
						Southern red oak----	76	4	
						Sweetgum------------	82	6	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Virginia pine-------	---	---	
43D, 43E-------- Wilkes	7R	Moderate	Moderate	Slight	--------	Loblolly pine-------	75	7	Loblolly pine, Virginia pine.
						Post oak------------	79	4	
						Shortleaf pine------	63	7	
						Southern red oak----	76	4	
						Sweetgum------------	82	6	
						White oak-----------	---	---	
						Hickory-------------	---	---	
						Virginia pine-------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1B Appling	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
1C Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
2C Ashlar	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope, depth to rock.
2D, 2E Ashlar	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
3A Bolling	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness.
3B Bolling	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
4B Cecil	Slight	Slight	Moderate: slope.	Slight	Slight.
4C Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
5B3 Cecil	Slight	Slight	Moderate: slope.	Slight	Slight.
5C3 Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
6B*:					
Cecil	Slight	Slight	Moderate: slope.	Slight	Slight.
Urban land.					
6C*:					
Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Urban land.					
7A Chenneby	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
8A*:					
Chenneby	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8A*:					
Toccoa	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
9B Creedmoor	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
9C Creedmoor	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Moderate: wetness.	Moderate: wetness, slope.
10B Cullen	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
11B3 Cullen	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
11C3 Cullen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
12B Enott	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
12C Enott	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
12D Enott	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
13D Goldston	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: large stones, slope, depth to rock.
14C*:					
Goldston	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.	Severe: large stones, depth to rock.
Tatum	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
15E*:					
Goldston	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: large stones, slope, depth to rock.
Rock outcrop	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
16B------------------- Helena	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
16C------------------- Helena	Moderate: slope, wetness, percs slowly.	Moderate: slope, percs slowly, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.
17B, 18B3------------- Hiwassee	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
18C3------------------ Hiwassee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
19B------------------- Hiwassee	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Moderate: large stones.	Moderate: large stones.
19C------------------- Hiwassee	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.	Moderate: large stones, slope.
20B------------------- Leaksville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
21D------------------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
21E------------------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
22B------------------- Mattaponi	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.
22C------------------- Mattaponi	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
23B------------------- Mayodan	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
23C------------------- Mayodan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
23D------------------- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
24B------------------- Meadows	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight----------	Severe: depth to rock.
24C------------------- Meadows	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight----------	Severe: depth to rock.
25B------------------- Orange	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, depth to rock.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
26B------------------- Pacolet	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
26D------------------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
26E------------------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
27C3------------------ Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
28C------------------- Pinkston	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.	Severe: large stones.
28D------------------- Pinkston	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
29C*:					
Pinkston-------------	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Severe: large stones.	Severe: large stones.
Mayodan--------------	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: large stones.	Severe: large stones.
29D*, 29E*:					
Pinkston-------------	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: large stones, slope.	Severe: large stones, slope.
Mayodan--------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope.
30*. Pits, quarry					
31C------------------- Poindexter	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope, depth to rock.
31D------------------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
32C------------------- Rion	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: droughty, slope.
33A------------------- Riverview	Severe: flooding.	Slight----------	Moderate: flooding.	Slight----------	Moderate: flooding.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
34B Sheva	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness, depth to rock.
34C Sheva	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope, depth to rock.
35B State	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
36B Stoneville	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones.
36C Stoneville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
36D Stoneville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
37B Tatum	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
37C Tatum	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
37D Tatum	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
37E Tatum	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
38A Toccoa	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
39*. Udorthents					
40*. Urban land					
41A Wehadkee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
42B Wickham	Slight	Slight	Moderate: slope.	Slight	Slight.
43C Wilkes	Severe: depth to rock, too clayey, small stones.	Severe: depth to rock.	Severe: slope, small stones.	Slight	Severe: depth to rock.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
43D------------------- Wilkes	Severe: depth to rock, too clayey, small stones.	Severe: slope, depth to rock.	Severe: slope, small stones.	Moderate: slope.	Severe: slope, depth to rock.
43E------------------- Wilkes	Severe: depth to rock, too clayey, small stones.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
1B----------------- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
1C----------------- Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
2C----------------- Ashlar	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
2D----------------- Ashlar	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
2E----------------- Ashlar	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
3A----------------- Bolling	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
3B----------------- Bolling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
4B----------------- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
4C----------------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
5B3---------------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
5C3---------------- Cecil	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
6B*:										
Cecil-------------	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
6C*:										
Cecil-------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
7A----------------- Chenneby	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
8A*:										
Chenneby----------	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Toccoa------------	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
9B----------------- Creedmoor	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
9C----------------- Creedmoor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
10B---------------- Cullen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
11B3--------------- Cullen	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
11C3--------------- Cullen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
12B---------------- Enott	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
12C---------------- Enott	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
12D---------------- Enott	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
13D---------------- Goldston	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
14C*:										
Goldston----------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Tatum-------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
15E*:										
Goldston----------	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
16B---------------- Helena	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
16C---------------- Helena	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
17B---------------- Hiwassee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
18B3--------------- Hiwassee	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
18C3--------------- Hiwassee	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
19B---------------- Hiwassee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
19C---------------- Hiwassee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
20B---------------- Leaksville	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
21D---------------- Madison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
21E---------------- Madison	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
22B---------------- Mattaponi	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
22C---------------- Mattaponi	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
23B---------------- Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
23C---------------- Mayodan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
23D---------------- Mayodan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
24B, 24C----------- Meadows	Poor	Poor	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
25B---------------- Orange	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
26B---------------- Pacolet	Fair	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
26D, 26E----------- Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
27C3--------------- Pacolet	Poor	Fair	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
28C---------------- Pinkston	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
28D---------------- Pinkston	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
29C*:										
Pinkston----------	Very poor.	Poor	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Mayodan-----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
29D*, 29E*:										
Pinkston----------	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Mayodan-----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
30*. Pits, quarry										
31C Poindexter	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
31D Poindexter	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
32C Rion	Poor	Fair	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
33A Riverview	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
34B Sheva	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
34C Sheva	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
35B State	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
36B Stoneville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
36C Stoneville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
36D Stoneville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
37B Tatum	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
37C Tatum	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
37D Tatum	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
37E Tatum	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
38A Toccoa	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
39*. Udorthents										
40*. Urban land										
41A Wehadkee	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.
42B Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
43C, 43D----------- Wilkes	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
43E---------------- Wilkes	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1B Appling	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
1C Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
2C Ashlar	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: droughty, slope, depth to rock.
2D, 2E Ashlar	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
3A Bolling	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: low strength, wetness, flooding.	Moderate: wetness.
3B Bolling	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
4B Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
4C Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
5B3 Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
5C3 Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
6B*:						
Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Urban land.						
6C*:						
Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
Urban land.						
7A Chenneby	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Moderate: wetness, flooding.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8A*:						
Chenneby	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: flooding.
Toccoa	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
9B Creedmoor	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
9C Creedmoor	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.
10B, 11B3 Cullen	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
11C3 Cullen	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
12B Enott	Moderate: too clayey.	Slight	Severe: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
12C Enott	Moderate: too clayey, slope.	Moderate: slope.	Severe: shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
12D Enott	Severe: slope.	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
13D Goldston	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope, depth to rock.
14C*:						
Goldston	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, large stones.	Severe: large stones, depth to rock.
Tatum	Moderate: slope, too clayey.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
15E*:						
Goldston	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope, depth to rock.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
15E*:						
Rock outcrop-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
16B--------------- Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
16C--------------- Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope, wetness.
17B, 18B3--------- Hiwassee	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
18C3-------------- Hiwassee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
19B--------------- Hiwassee	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Moderate: large stones.
19C--------------- Hiwassee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: large stones, slope.
20B--------------- Leaksville	Severe: depth to rock, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, depth to rock, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
21D, 21E---------- Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
22B--------------- Mattaponi	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
22C--------------- Mattaponi	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
23B--------------- Mayodan	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
23C--------------- Mayodan	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
23D--------------- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
24B--------------- Meadows	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Severe: depth to rock.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
24C--------------- Meadows	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: depth to rock.
25B--------------- Orange	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness, depth to rock.
26B--------------- Pacolet	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
26D, 26E---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
27C3-------------- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
28C--------------- Pinkston	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: large stones.
28D--------------- Pinkston	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
29C*:						
Pinkston---------	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, large stones.	Severe: large stones.
Mayodan----------	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Severe: large stones.
29D*, 29E*:						
Pinkston---------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Mayodan----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: large stones, slope.
30*. Pits, quarry						
31C--------------- Poindexter	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope, depth to rock.
31D--------------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
32C--------------- Rion	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
33A--------------- Riverview	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
34B--------------- Sheva	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness, depth to rock.
34C--------------- Sheva	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope, depth to rock.
35B--------------- State	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding.	Slight.
36B--------------- Stoneville	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
36C--------------- Stoneville	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope.
36D--------------- Stoneville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
37B--------------- Tatum	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: small stones.
37C--------------- Tatum	Moderate: slope, too clayey.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
37D, 37E---------- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
38A--------------- Toccoa	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
39*. Udorthents						
40*. Urban land						
41A--------------- Wehadkee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.
42B--------------- Wickham	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
43C--------------- Wilkes	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Severe: depth to rock.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
43D, 43E---------- Wilkes	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: low strength, slope.	Severe: slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1B: Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
1C: Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
2C: Ashlar	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: depth to rock, small stones.
2D, 2E: Ashlar	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Poor: depth to rock, small stones, slope.
3A: Bolling	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack.
3B: Bolling	Severe: wetness.	Severe: wetness.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack.
4B: Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
4C: Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, hard to pack.
5B3: Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
5C3: Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, hard to pack.
6B*:					
Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
Urban land.					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
6C*:					
Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, hard to pack.
Urban land.					
7A: Chenneby	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
8A*:					
Chenneby	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
Toccoa	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Good.
9B: Creedmoor	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
9C: Creedmoor	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
10B, 11B3: Cullen	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
11C3: Cullen	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
12B: Enott	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
12C: Enott	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
12D: Enott	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
13D: Goldston	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
14C*:					
Goldston	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock, small stones.
Tatum	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack, small stones.
15E*:					
Goldston	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Rock outcrop	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
16B Helena	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
16C Helena	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
17B, 18B3 Hiwassee	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
18C3 Hiwassee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
19B Hiwassee	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
19C Hiwassee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
20B Leaksville	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: depth to rock, wetness.	Poor: depth to rock, too clayey, hard to pack.
21D, 21E Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
22B Mattaponi	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
22C: Mattaponi	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
23B: Mayodan	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
23C: Mayodan	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
23D: Mayodan	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
24B: Meadows	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Poor: thin layer, area reclaim.
24C: Meadows	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Poor: thin layer, area reclaim.
25B: Orange	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
26B: Pacolet	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.
26D, 26E: Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
27C3: Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
28C: Pinkston	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
28D: Pinkston	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
29C*:					
Pinkston	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
Mayodan	Moderate: percs slowly, slope.	Severe: slope, large stones.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
29D*, 29E*:					
Pinkston	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Mayodan	Severe: slope.	Severe: slope, large stones.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
30*. Pits, quarry					
31C Poindexter	Severe: depth to rock.	Severe: seepage, slope, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: depth to rock.
31D Poindexter	Severe: slope, depth to rock.	Severe: seepage, slope, depth to rock.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope, depth to rock.	Poor: slope, depth to rock.
32C Rion	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
33A Riverview	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
34B Sheva	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock, thin layer.
34C Sheva	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock, thin layer.
35B State	Moderate: flooding, wetness, percs slowly.	Severe: seepage.	Severe: seepage, wetness.	Moderate: flooding, wetness.	Fair: too clayey, thin layer.
36B Stoneville	Moderate: depth to rock, percs slowly.	Moderate: depth to rock, seepage, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
36C Stoneville	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
36D----------------- Stoneville	Severe: slope.	Severe: slope.	Severe: depth to rock, too clayey, slope.	Severe: slope.	Poor: too clayey, slope, hard to pack.
37B----------------- Tatum	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack, small stones.
37C----------------- Tatum	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack, small stones.
37D, 37E------------ Tatum	Severe: slope.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: too clayey, hard to pack, small stones.
38A----------------- Toccoa	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Good.
39*. Udorthents					
40*. Urban land					
41A----------------- Wehadkee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness, thin layer.
42B----------------- Wickham	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
43C----------------- Wilkes	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
43D, 43E------------ Wilkes	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1B, 1C: Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
2C: Ashlar	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
2D, 2E: Ashlar	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
3A, 3B: Bolling	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, small stones.
4B, 4C, 5B3, 5C3: Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
6B*, 6C*:				
Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
7A: Chenneby	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
8A*:				
Chenneby	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Toccoa	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
9B, 9C: Creedmoor	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
10B, 11B3, 11C3: Cullen	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
12B, 12C: Enott	Poor: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
12D: Enott	Poor: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
13D: Goldston	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
14C*:				
Goldston	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
14C*:				
Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey, area reclaim.
15E*:				
Goldston	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
16B, 16C Helena	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
17B, 18B3, 18C3, 19B, 19C Hiwassee	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
20B Leaksville	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
21D Madison	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
21E Madison	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
22B, 22C Mattaponi	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
23B, 23C Mayodan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
23D Mayodan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
24B, 24C Meadows	Poor: depth to rock, area reclaim.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: depth to rock, thin layer, area reclaim.
25B Orange	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
26B Pacolet	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
26D------------------- Pacolet	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
26E------------------- Pacolet	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
27C3------------------ Pacolet	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
28C------------------- Pinkston	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
28D------------------- Pinkston	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
29C*:				
Pinkston-------------	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Mayodan--------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
29D*, 29E*:				
Pinkston-------------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Mayodan--------------	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
30*. Pits, quarry				
31C------------------- Poindexter	Poor: depth to rock.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Fair: small stones, slope, depth to rock.
31D------------------- Poindexter	Poor: depth to rock.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: slope.
32C------------------- Rion	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
33A------------------- Riverview	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
34B------------------- Sheva	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, thin layer.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
34C------------------ Sheva	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, thin layer, slope.
35B------------------ State	Good	Probable	Improbable: too sandy.	Fair: too clayey.
36B, 36C------------- Stoneville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
36D------------------ Stoneville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
37B, 37C, 37D-------- Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey, area reclaim.
37E------------------ Tatum	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey, area reclaim.
38A------------------ Toccoa	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
39*. Udorthents				
40*. Urban land				
41A------------------ Wehadkee	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
42B------------------ Wickham	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
43C, 43D------------- Wilkes	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, small stones.
43E------------------ Wilkes	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, too clayey, small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
1B-Appling	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Soil blowing	Favorable.
1C-Appling	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Soil blowing, slope.	Slope.
2C, 2D, 2E-Ashlar	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
3A-Bolling	Moderate: seepage.	Severe: wetness.	Favorable	Wetness	Wetness	Favorable.
3B-Bolling	Moderate: seepage, slope.	Severe: wetness.	Slope	Wetness, slope.	Wetness	Favorable.
4B-Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope	Favorable	Favorable.
4C-Cecil	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
5B3-Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope	Favorable	Favorable.
5C3-Cecil	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
6B*:						
Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope	Favorable	Favorable.
Urban land.						
6C*:						
Cecil	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
Urban land.						
7A-Chenneby	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
8A*:						
Chenneby	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
Toccoa	Severe: seepage.	Severe: piping.	Flooding	Flooding	Favorable	Favorable.
9B Creedmoor	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, soil blowing.	Wetness, soil blowing.	Rooting depth, percs slowly.
9C Creedmoor	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, soil blowing.	Slope, wetness, soil blowing.	Slope, rooting depth, percs slowly.
10B Cullen	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
11B3 Cullen	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
11C3 Cullen	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
12B Enott	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Percs slowly	Percs slowly.
12C, 12D Enott	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
13D Goldston	Severe: depth to rock, slope.	Severe: piping, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
14C*:						
Goldston	Severe: depth to rock, slope.	Severe: piping, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Tatum	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
15E*:						
Goldston	Severe: depth to rock, slope.	Severe: piping, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.
16B Helena	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, percs slowly.	Wetness, soil blowing, percs slowly.	Percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
16C Helena	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, wetness, soil blowing.	Slope, percs slowly.
17B, 18B3 Hiwassee	Moderate: seepage, slope.	Moderate: hard to pack.	Deep to water	Slope	Favorable	Favorable.
18C3 Hiwassee	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope	Slope	Slope.
19B Hiwassee	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Soil blowing	Favorable.
19C Hiwassee	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
20B Leaksville	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly, depth to rock.	Wetness, percs slowly, depth to rock.	Depth to rock, erodes easily, wetness.	Wetness, erodes easily, depth to rock.
21D, 21E Madison	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
22B Mattaponi	Moderate: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope	Favorable	Favorable.
22C Mattaponi	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope	Slope	Slope.
23B Mayodan	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Soil blowing	Favorable.
23C, 23D Mayodan	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
24B Meadows	Severe: seepage, depth to rock.	Severe: thin layer, piping.	Depth to rock, slope.	Slope, depth to rock.	Depth to rock	Depth to rock.
24C Meadows	Severe: seepage, depth to rock, slope.	Severe: thin layer, piping.	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
25B Orange	Moderate: depth to rock.	Severe: piping, hard to pack.	Percs slowly	Depth to rock, wetness.	Wetness, percs slowly.	Wetness, depth to rock.
26B Pacolet	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Soil blowing	Favorable.
26D, 26E Pacolet	Severe: slope.	Severe: piping.	Deep to water	Slope	Soil blowing, slope.	Slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
27C3 Pacolet	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
28C, 28D Pinkston	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
29C*, 29D*, 29E*:						
Pinkston	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Mayodan	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, droughty.	Slope, large stones.	Large stones, slope, droughty.
30*. Pits, quarry						
31C, 31D Poindexter	Severe: seepage, slope.	Severe: piping, thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
32C Rion	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, slope.	Soil blowing, slope.	Slope, droughty.
33A Riverview	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
34B Sheva	Moderate: depth to rock, slope.	Severe: thin layer.	Depth to rock, slope.	Slope, wetness, depth to rock.	Depth to rock, wetness.	Depth to rock.
34C Sheva	Severe: slope.	Severe: thin layer.	Depth to rock, slope.	Slope, wetness, depth to rock.	Slope, depth to rock, wetness.	Slope, depth to rock.
35B State	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Soil blowing	Soil blowing	Favorable.
36B Stoneville	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
36C, 36D Stoneville	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
37B Tatum	Moderate: seepage, depth to rock, slope.	Severe: piping, hard to pack.	Deep to water	Slope	Favorable	Favorable.
37C, 37D, 37E Tatum	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
38A Toccoa	Severe: seepage.	Severe: piping.	Flooding	Flooding	Favorable	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
39*. Udorthents						
40*. Urban land						
41A--------------- Wehadkee	Moderate: seepage.	Severe: wetness, piping.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
42B--------------- Wickham	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Soil blowing---	Favorable.
43C, 43D, 43E----- Wilkes	Severe: slope, depth to rock.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1B, 1C----------- Appling	0-7	Sandy loam-------	SM, SC-SM	A-2	0-5	86-100	80-100	55-91	15-35	<35	NP-7
	7-34	Sandy clay, sandy clay loam, clay.	MH, ML, CL	A-7	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	34-65	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	85-100	70-90	40-75	25-45	8-22
2C, 2D, 2E------- Ashlar	0-16	Fine sandy loam	SM, SC-SM	A-2, A-4, A-1	0-2	80-95	75-95	40-80	20-50	<25	NP-6
	16-30	Sandy loam, fine sandy loam, gravelly sandy loam.	GM-GC, SC-SM, GM, SM	A-1, A-2, A-4	2-8	55-95	50-90	30-75	15-50	<25	NP-6
	30-34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
3A, 3B----------- Bolling	0-9	Fine sandy loam	ML, CL, SM, SC	A-4	0	85-100	75-100	60-95	35-85	<30	NP-10
	9-53	Clay loam, sandy clay loam, silty clay loam.	CL, SC	A-6, A-7	0	95-100	75-100	70-95	40-85	30-45	11-20
	53-65	Sandy clay loam, silty clay loam, clay.	CL, CH, SC	A-6, A-7	0	95-100	75-100	70-100	40-90	30-60	11-35
4B, 4C----------- Cecil	0-8	Sandy loam-------	SM, SC-SM	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-7
	8-59	Clay, clay loam	MH, ML	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	59-65	Loam, sandy clay loam.	SM, SC, CL, ML	A-4, A-6	0-5	97-100	92-100	72-95	40-75	25-40	5-20
5B3, 5C3--------- Cecil	0-8	Sandy clay loam	SM, SC, CL, ML	A-4, A-6	0-5	75-100	75-100	68-95	38-81	21-35	3-15
	8-59	Clay, clay loam	MH, ML	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	59-65	Loam, sandy clay loam.	SM, SC, CL, ML	A-4 A-6	0-5	97-100	92-100	72-95	40-75	25-40	5-20
6B*, 6C*:											
Cecil-----------	0-8	Sandy loam-------	SM, SC-SM	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-7
	8-59	Clay, clay loam	MH, ML	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	59-65	Loam, sandy clay loam.	SM, SC, CL, ML	A-4 A-6	0-5	97-100	92-100	72-95	40-75	25-40	5-20
Urban land.											
7A--------------- Chenneby	0-6	Loam-------------	CL, ML, CL-ML	A-4, A-6	0	100	95-100	90-100	60-90	20-35	3-15
	6-65	Loam, clay loam, silty clay loam.	CL, ML, MH, CH	A-4, A-6, A-7	0	100	95-100	90-100	75-95	30-55	8-20
8A*:											
Chenneby--------	0-6	Loam-------------	CL, ML, CL-ML	A-4, A-6	0	100	95-100	90-100	60-90	20-35	3-15
	6-65	Loam, clay loam, silty clay loam.	CL, ML, MH, CH	A-4, A-6, A-7	0	100	95-100	90-100	75-95	30-55	8-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
8A*:											
Toccoa----------	0-8	Fine sandy loam	SM	A-2, A-4	0	95-100	95-100	50-85	30-55	<30	NP-4
	8-65	Sandy loam, loam, fine sandy loam.	SM, ML	A-2, A-4	0	95-100	90-100	60-100	30-55	<30	NP-4
9B, 9C----------- Creedmoor	0-10	Fine sandy loam	SM, SC-SM	A-4, A-2	0-3	98-100	95-100	70-90	30-49	<25	NP-7
	10-65	Clay, silty clay, sandy clay.	CH	A-7	0-3	98-100	95-100	85-97	70-95	51-79	25-49
10B-------------- Cullen	0-6	Loam------------	CL, CL-ML	A-6, A-4	0	90-100	75-100	75-95	50-75	25-40	7-20
	6-42	Clay, clay loam	MH, ML	A-7	0	90-100	75-100	75-100	65-95	45-80	15-35
	42-75	Clay, clay loam, silty clay loam, silty clay.	CL, CH	A-7, A-6	0	90-100	75-100	75-100	65-95	35-60	15-30
	75-90	Clay loam, loam, silt loam.	CL, ML	A-7, A-6, A-4	0	90-100	75-100	75-100	60-85	30-50	7-25
11B3, 11C3------- Cullen	0-6	Clay loam--------	CL	A-7, A-6	0	90-100	75-100	75-100	60-80	35-50	11-25
	6-42	Clay, clay loam	MH, ML	A-7	0	90-100	75-100	75-100	65-95	45-80	15-35
	42-75	Clay, clay loam, silty clay loam, silty clay.	CL, CH	A-7, A-6	0	90-100	75-100	75-100	65-95	35-60	15-30
	75-90	Clay loam, loam, silt loam.	CL, ML	A-7, A-6, A-4	0	90-100	75-100	75-100	60-85	30-50	7-25
12B, 12C, 12D---- Enott	0-10	Fine sandy loam	SM, SC-SM, SC	A-2-4, A-4	0-5	80-100	80-100	60-85	25-49	15-30	NP-10
	10-33	Clay loam, sandy clay loam, clay.	CL, CH, SM	A-6, A-7	0-5	80-100	80-100	65-95	45-80	25-65	10-45
	33-42	Sandy loam, sandy clay loam, clay.	CH, CL, SM	A-7, A-6, A-4, A-2-4	0-5	85-100	80-100	50-95	25-80	15-50	NP-30
	42	Weathered bedrock	---	---	---	---	---	---	---	---	---
13D-------------- Goldston	0-3	Very channery silt loam.	GM, SM, ML	A-2-4, A-4, A-1-b	20-50	40-80	30-80	25-80	20-60	20-40	NP-10
	3-15	Very channery silt loam, very channery very fine sandy loam.	GM, SM, ML	A-2-4, A-4, A-1-b	20-50	40-80	30-80	25-80	20-60	20-40	NP-10
	15-22	Weathered bedrock	---	---	---	---	---	---	---	---	---
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
14C*:											
Goldston--------	0-3	Very channery silt loam.	GM, SM, ML	A-2-4, A-4, A-1-b	20-50	40-80	30-80	25-80	20-60	20-40	NP-10
	3-15	Very channery silt loam, very channery very fine sandy loam.	GM, SM, ML	A-2-4, A-4, A-1-b	20-50	40-80	30-80	25-80	20-60	20-40	NP-10
	15-22	Weathered bedrock	---	---	---	---	---	---	---	---	---
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
14C*:											
Tatum-----------	0-6	Gravelly loam----	GM, ML, SM	A-4	0-10	60-80	55-75	45-75	40-70	18-32	NP-10
	6-54	Silty clay loam, silty clay, clay, gravelly clay, silt loam.	MH, GM, SM, GC	A-7	0-10	60-100	55-95	50-95	45-90	50-80	20-45
	54-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
15E*:											
Goldston--------	0-3	Very channery silt loam.	GM, SM, ML	A-2-4, A-4, A-1-b	20-50	40-80	30-80	25-80	20-60	20-40	NP-10
	3-15	Very channery silt loam, very channery very fine sandy loam.	GM, SM, ML	A-2-4, A-4, A-1-b	20-50	40-80	30-80	25-80	20-60	20-40	NP-10
	15-22	Weathered bedrock	---	---	---	---	---	---	---	---	---
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
16B, 16C--------- Helena	0-14	Sandy loam-------	SM, SC-SM, SC, ML	A-2, A-4	0-5	95-100	90-100	51-95	26-75	<35	NP-10
	14-18	Sandy clay loam, clay loam.	CL, SC	A-6, A-7	0-5	95-100	95-100	70-90	38-70	30-49	15-26
	18-37	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	95-100	73-97	56-86	50-85	24-50
	37-65	Sandy clay loam, clay loam, sandy loam.	CL, SC, SM	A-4, A-6, A-7	0-5	95-100	95-100	51-90	26-70	20-40	5-15
17B-------------- Hiwassee	0-6	Loam-------------	CL, ML, CL-ML	A-7-6, A-6, A-4	0-2	95-100	95-100	88-100	50-85	25-49	3-23
	6-65	Clay, silty clay, clay loam.	ML, MH	A-7-5, A-7-6	0-2	95-100	95-100	80-100	51-95	40-80	12-36
18B3, 18C3------- Hiwassee	0-6	Clay loam--------	CL, ML, CL-ML	A-7-6, A-6, A-4	0-2	95-100	95-100	88-100	50-85	25-49	3-23
	6-65	Clay, silty clay, clay loam.	ML, MH	A-7-5, A-7-6	0-2	95-100	95-100	80-100	51-95	40-80	12-36
19B, 19C--------- Hiwassee	0-6	Cobbly sandy loam	SM, ML, CL-ML, SC-SM	A-2, A-4	15-30	80-100	75-90	50-85	25-55	<25	NP-5
	6-65	Clay, silty clay, clay loam.	ML, MH	A-7-5, A-7-6	0-5	90-100	90-100	80-100	51-95	40-80	12-36
20B-------------- Leaksville	0-7	Silt loam--------	ML, CL-ML, CL	A-4, A-6, A-7	0-15	90-100	80-95	70-90	50-85	25-49	6-20
	7-21	Clay loam, clay, silty clay.	CH	A-7	0-10	90-100	80-95	75-90	60-90	55-99	35-75
	21-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
21D, 21E--------- Madison	0-3	Fine sandy loam	SM, ML	A-2, A-4	0-3	85-100	80-100	60-90	26-55	<35	NP-8
	3-19	Clay, clay loam, sandy clay.	MH, ML	A-7	0-3	90-100	85-100	75-97	57-85	43-75	12-35
	19-37	Loam, sandy clay loam, clay loam.	CL	A-4, A-6	0-3	90-100	85-100	70-95	50-80	20-40	7-20
	37-65	Fine sandy loam, sandy loam, loam.	SM, ML	A-2, A-4	0-5	85-100	80-100	60-90	26-55	<35	NP-7
22B, 22C--------- Mattaponi	0-8	Sandy loam-------	SM, SC, SC-SM	A-2, A-4	0	90-100	85-100	50-100	20-50	<25	NP-10
	8-99	Sandy clay loam, clay loam, sandy clay, clay.	CL, CH, SC	A-6, A-7	0	80-100	75-100	65-100	45-95	35-70	15-40
23B, 23C, 23D---- Mayodan	0-9	Fine sandy loam	SM, ML	A-2, A-4	0-5	92-100	83-100	49-98	30-70	<36	NP-8
	9-39	Clay, sandy clay, silty clay.	MH, CH, CL, ML	A-7	0-2	95-100	90-100	80-100	50-98	41-80	15-45
	39-65	Loam, sandy clay loam, clay loam.	CL, ML, CL-ML	A-4, A-6	0-2	95-100	90-100	75-100	35-80	25-40	5-20
24B, 24C--------- Meadows	0-4	Gravelly loam----	ML, CL	A-4, A-6	0-5	55-80	50-75	40-75	35-70	15-35	NP-15
	4-9	Gravelly loam, gravelly silt loam.	ML, CL	A-2-4, A-2-6, A-4, A-6	0-5	55-80	50-75	40-75	35-70	15-35	NP-15
	9-16	Silt loam, gravelly silt loam, gravelly loam.	ML, CL, SM, SC	A-4, A-6	0-5	75-100	65-90	50-90	35-80	15-35	NP-15
	16-24	Weathered bedrock	---	---	---	---	---	---	---	---	---
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
25B------------- Orange	0-10	Loam------------	SM, ML, CL-ML, SC-SM	A-4	0	90-100	75-100	75-95	45-85	<30	NP-10
	10-28	Clay, silty clay, channery silty clay loam.	CH, SC	A-7	0	90-95	50-95	50-95	45-90	70-99	45-70
	28-42	Sandy loam, very channery silt loam, sandy clay loam.	SC, CL, GC	A-6, A-7	0-40	70-100	40-100	40-100	30-90	25-45	10-25
	42-55	Weathered bedrock	---	---	---	---	---	---	---	---	---
	55	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
26B, 26D, 26E---- Pacolet	0-10	Fine sandy loam	SM, SC-SM	A-2, A-1-b, A-4	0-2	85-100	80-100	42-90	16-42	<28	NP-7
	10-27	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	27-40	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	40-65	Sandy loam, sandy clay loam, loam.	SM, SC-SM	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
27C3------------- Pacolet	0-10	Sandy clay loam	SC-SM, SC	A-4, A-6	0-1	95-100	90-100	65-85	36-50	20-40	4-17
	10-27	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	27-40	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	40-65	Sandy loam, sandy clay loam, loam.	SM, SC-SM	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6
28C, 28D--------- Pinkston	0-8	Cobbly sandy loam	SM, CL-ML, SC	A-2-4, A-4	20-35	80-95	75-95	45-75	25-50	<20	NP-5
	8-18	Loam, fine sandy loam, gravelly sandy loam, sandy clay loam.	SC, CL, ML, SM	A-2, A-4, A-1	0-10	70-100	55-100	35-95	20-75	<30	NP-10
	18-29	Gravelly sandy loam, loam, silt loam.	CL, GM, GP-GM, ML	A-1, A-2, A-4, A-6	0-10	40-100	35-85	20-80	10-60	16-35	3-15
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
29C*, 29D*, 29E*:											
Pinkston--------	0-8	Very stony sandy loam.	SM, CL-ML, GP-GM	A-2-4, A-4	35-60	85-95	75-95	45-75	25-50	<20	NP-5
	8-18	Loam, fine sandy loam, gravelly sandy loam, sandy clay loam.	SC, CL, ML, SM	A-2, A-4, A-1	0-10	70-100	55-100	35-95	20-75	<30	NP-10
	18-29	Gravelly sandy loam, loam, silt loam.	CL, GM, GP-GM, ML	A-2, A-1, A-4, A-6	0-10	40-100	35-85	20-80	10-60	16-35	3-15
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Mayodan---------	0-9	Very stony fine sandy loam.	SM, SC-SM, GM, GM-GC	A-1-b, A-2-4	20-45	50-80	50-75	40-65	15-35	<30	NP-7
	9-39	Clay, sandy clay, silty clay.	CL, MH, CH, SC	A-7	0-5	95-100	90-100	80-100	40-95	40-80	15-45
	39-65	Loam, sandy clay loam, clay loam.	CL, ML, CL-ML	A-4, A-6	0-5	95-100	90-100	75-100	35-80	25-40	5-20
30*. Pits, quarry											
31C, 31D--------- Poindexter	0-10	Fine sandy loam	SM, SC, SC-SM	A-2, A-4	0	90-100	85-100	50-100	20-50	<25	NP-10
	10-18	Clay loam, sandy clay loam, gravelly loam.	SC, CL	A-6	0	90-100	50-100	45-100	35-85	30-40	11-20
	18-27	Fine sandy loam, loam, gravelly sandy clay loam.	SM, ML, CL-ML, SC-SM	A-2, A-4	0	90-100	50-100	45-95	30-70	<20	NP-5
	27-55	Weathered bedrock	---	---	---	---	---	---	---	---	---
	55	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
32C-------------- Rion	0-10	Fine sandy loam	SM	A-2, A-4	0-2	90-100	85-100	60-80	20-45	<35	NP-7
	10-35	Sandy loam, sandy clay loam, clay loam.	SC, SC-SM, CL-ML, CL	A-2, A-4, A-6	0-2	90-100	85-100	60-85	30-60	20-35	5-15
	35-65	Sandy loam, sandy clay loam, loamy sand.	SC, SM, SC-SM	A-2, A-4, A-6	0-2	90-100	80-100	60-85	15-50	<36	NP-12
33A-------------- Riverview	0-11	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	60-80	15-30	3-14
	11-65	Sandy clay loam, silty clay loam, loam.	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	60-95	20-40	3-20
34B, 34C--------- Sheva	0-10	Fine sandy loam	SM, SC, SC-SM	A-2-4, A-4	0-15	95-100	95-100	45-85	20-50	<30	NP-7
	10-29	Loam, sandy clay loam, clay loam.	SM, SC, ML, CL	A-2-6, A-6	0-5	95-100	80-100	60-100	25-80	30-40	11-20
	29-56	Weathered bedrock	---	---	---	---	---	---	---	---	---
	56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
35B-------------- State	0-9	Sandy loam-------	SM, ML, CL-ML, SC-SM	A-2, A-4	0	95-100	95-100	45-85	25-55	<28	NP-7
	9-38	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	95-100	95-100	75-100	35-80	24-40	8-22
	38-65	Stratified sand to fine sandy loam.	SM, SC-SM, SP-SM	A-1, A-2, A-3, A-4	0	85-100	60-100	40-90	5-50	<25	NP-7
36B, 36C, 36D---- Stoneville	0-9	Silt loam--------	CL, ML, CL-ML	A-4, A-6, A-7-6	0-8	95-100	90-100	75-100	50-90	24-49	6-20
	9-21	Clay, clay loam, silty clay.	CL, CH	A-7	0-5	95-100	95-100	90-100	51-95	40-70	17-42
	21-43	Clay loam, silty clay loam, silt loam.	CL, ML	A-7, A-6	0-5	95-100	95-100	85-100	51-97	25-49	11-23
	43-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
37B, 37C, 37D, 37E------------- Tatum	0-6	Gravelly loam----	GM, ML, SM	A-4	0-10	60-80	55-75	45-75	40-70	18-32	NP-10
	6-54	Silty clay loam, silty clay, clay, gravelly clay, silt loam.	MH, GM, SM, GC	A-7	0-10	60-100	55-95	50-95	45-90	50-80	20-45
	54-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
38A-------------- Toccoa	0-8	Fine sandy loam	SM	A-2, A-4	0	95-100	95-100	50-85	30-55	<30	NP-4
	8-65	Fine sandy loam, loam.	SM, ML	A-2, A-4	0	95-100	90-100	60-100	30-55	<30	NP-4
39*. Udorthents											
40*. Urban land											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
41A-------------- Wehadkee	0-6	Silt loam--------	CL, MH, ML, CH	A-6, A-7	0	100	98-100	85-100	51-98	30-58	10-24
	6-31	Silt loam, silty clay loam, loam.	CL, CL-ML, ML, SC	A-6, A-7, A-4	0	100	99-100	85-100	45-98	20-58	6-25
	31-65	Stratified sand to silty clay loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	99-100	50-100	5-98	<30	NP-15
42B-------------- Wickham	0-9	Sandy loam-------	SM, SC-SM, ML, CL-ML	A-4	0	95-100	90-100	70-100	45-80	<25	NP-7
	9-43	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM	A-2, A-4, A-6, A-7-6	0	95-100	90-100	75-100	30-70	20-41	3-15
	43-65	Stratified sand to gravelly sandy clay loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	95-100	90-100	45-90	5-55	<30	NP-15
43C, 43D, 43E---- Wilkes	0-8	Gravelly fine sandy loam.	SM, SC-SM	A-2, A-4, A-1-b	5-15	70-80	60-75	45-75	20-49	<20	NP-7
	8-13	Clay loam, clay, sandy clay loam.	CL, CH	A-6, A-7	0-10	80-100	80-100	75-96	50-85	30-60	11-35
	13-48	Weathered bedrock	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
1B, 1C----------- Appling	0-7	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.24	4	.5-2
	7-34	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.28		
	34-65	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28		
2C, 2D, 2E------- Ashlar	0-16	5-15	1.30-1.55	2.0-6.0	0.08-0.15	4.5-5.5	Low----------	0.24	2	.5-1
	16-30	5-15	1.30-1.55	2.0-6.0	0.04-0.14	4.5-5.5	Low----------	0.24		
	30-34	---	---	---	---	---	-------------	----		
3A, 3B----------- Bolling	0-9	5-20	1.20-1.55	0.6-6.0	0.10-0.20	4.5-7.3	Low----------	0.28	4	1-2
	9-53	20-35	1.30-1.60	0.6-2.0	0.13-0.19	4.5-7.3	Low----------	0.28		
	53-65	25-55	1.30-1.60	0.6-2.0	0.10-0.19	5.6-8.4	Moderate-----	0.28		
4B, 4C----------- Cecil	0-8	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-5.5	Low----------	0.28	4	.5-2
	8-59	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	59-65	20-35	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low----------	0.28		
5B3, 5C3--------- Cecil	0-8	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28	3	.5-1
	8-59	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	59-65	20-35	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low----------	0.28		
6B*, 6C*:										
Cecil-----------	0-8	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-5.5	Low----------	0.28	4	.5-2
	8-59	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28		
	59-65	20-35	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low----------	0.28		
Urban land.										
7A--------------- Chenneby	0-6	12-27	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.37	5	.5-3
	6-65	18-35	1.30-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.32		
8A*:										
Chenneby--------	0-6	12-27	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.37	5	.5-3
	6-65	18-35	1.30-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.32		
Toccoa----------	0-8	2-15	1.40-1.55	2.0-6.0	0.09-0.12	5.1-6.5	Low----------	0.10	4	1-2
	8-65	2-19	1.40-1.50	2.0-6.0	0.09-0.12	5.1-6.5	-------------	----		
9B, 9C----------- Creedmoor	0-10	7-20	1.55-1.70	2.0-6.0	0.10-0.14	3.6-5.5	Low----------	0.28	3	.5-2
	10-65	35-60	1.30-1.50	<0.06	0.13-0.15	3.6-5.5	Moderate-----	0.32		
10B-------------- Cullen	0-6	15-27	1.20-1.50	2.0-6.0	0.14-0.19	5.1-6.0	Low----------	0.37	4	1-2
	6-42	35-70	1.30-1.60	0.6-2.0	0.10-0.14	5.1-6.0	Moderate-----	0.24		
	42-75	30-50	1.30-1.60	0.6-2.0	0.13-0.17	5.1-6.0	Moderate-----	0.24		
	75-90	20-40	1.30-1.50	0.6-2.0	0.12-0.16	5.1-6.0	Moderate-----	0.24		
11B3, 11C3------- Cullen	0-6	27-40	1.20-1.50	0.6-2.0	0.12-0.17	5.1-6.0	Moderate-----	0.24	3	.5-2
	6-42	35-70	1.30-1.60	0.6-2.0	0.10-0.14	5.1-6.0	Moderate-----	0.24		
	42-75	30-50	1.30-1.60	0.6-2.0	0.13-0.17	5.1-6.0	Moderate-----	0.24		
	75-90	20-40	1.30-1.50	0.6-2.0	0.12-0.16	5.1-6.0	Moderate-----	0.24		
12B, 12C, 12D---- Enott	0-10	5-20	1.45-1.65	2.0-6.0	0.11-0.15	5.1-7.8	Low----------	0.20	4	.5-2
	10-33	20-59	1.30-1.50	0.6-2.0	0.12-0.15	5.1-7.8	High---------	0.24		
	33-42	15-50	1.20-1.40	0.2-2.0	0.12-0.16	5.1-7.8	Moderate-----	0.28		
	42	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
13D Goldston	0-3	5-15	1.40-1.60	2.0-6.0	0.06-0.12	3.6-6.0	Low	0.05	1	.5-2
	3-15	5-27	1.40-1.60	2.0-6.0	0.06-0.12	3.6-6.0	Low	0.05		
	15-22	---	---	---	---	---	-------------	----		
	22	---	---	---	---	---	-------------	----		
14C*:										
Goldston	0-3	5-15	1.40-1.60	2.0-6.0	0.06-0.12	3.6-6.0	Low	0.05	1	.5-2
	3-15	5-27	1.40-1.60	2.0-6.0	0.06-0.12	3.6-6.0	Low	0.05		
	15-22	---	---	---	---	---	-------------	----		
	22	---	---	---	---	---	-------------	----		
Tatum	0-6	12-27	1.10-1.40	0.6-2.0	0.10-0.17	4.5-5.5	Low	0.20	4	.5-2
	6-54	45-60	1.40-1.45	0.6-2.0	0.08-0.12	4.5-5.5	Moderate	0.28		
	54-65	---	---	---	---	---	-------------	----		
15E*:										
Goldston	0-3	5-15	1.40-1.60	2.0-6.0	0.06-0.12	3.6-6.0	Low	0.05	1	.5-2
	3-15	5-27	1.40-1.60	2.0-6.0	0.06-0.12	3.6-6.0	Low	0.05		
	15-22	---	---	---	---	---	-------------	----		
	22	---	---	---	---	---	-------------	----		
Rock outcrop.										
16B, 16C Helena	0-14	5-20	1.58-1.62	2.0-6.0	0.10-0.12	3.6-6.5	Low	0.24	4	.5-2
	14-18	20-35	1.46-1.56	0.2-0.6	0.13-0.15	3.6-5.5	Moderate	0.28		
	18-37	35-60	1.44-1.55	0.06-0.2	0.13-0.15	3.6-5.5	High	0.28		
	37-65	15-35	1.45-1.55	0.2-0.6	0.13-0.15	3.6-5.5	Moderate	0.28		
17B Hiwassee	0-6	10-27	1.35-1.55	0.6-2.0	0.12-0.15	5.1-6.5	Low	0.28	5	.5-2
	6-65	35-60	1.30-1.45	0.6-2.0	0.12-0.15	5.1-6.5	Low	0.28		
18B3, 18C3 Hiwassee	0-6	27-35	1.35-1.55	0.6-2.0	0.12-0.15	5.1-6.5	Low	0.28	5	.5-2
	6-65	35-60	1.30-1.45	0.6-2.0	0.12-0.15	5.1-6.5	Low	0.28		
19B, 19C Hiwassee	0-6	8-18	1.35-1.55	2.0-6.0	0.08-0.12	5.1-6.5	Low	0.24	5	.5-2
	6-65	35-60	1.30-1.45	0.6-2.0	0.12-0.15	5.1-6.5	Low	0.28		
20B Leaksville	0-7	10-30	1.35-1.50	0.6-2.0	0.14-0.20	5.1-6.5	Low	0.43	2	.5-2
	7-21	35-60	1.30-1.45	0.06-0.2	0.12-0.18	6.1-7.8	High	0.24		
	21-30	---	---	---	---	---	-------------	----		
	30	---	---	---	---	---	-------------	----		
21D, 21E Madison	0-3	5-20	1.45-1.65	2.0-6.0	0.11-0.15	4.5-5.5	Low	0.24	4	.5-2
	3-19	30-50	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.32		
	19-37	25-35	1.30-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	37-65	5-20	1.30-1.50	0.6-2.0	0.10-0.14	4.5-5.5	Low	0.37		
22B, 22C Mattaponi	0-8	5-18	1.30-1.55	0.6-6.0	0.08-0.15	4.5-6.0	Low	0.28	5	.5-2
	8-99	35-65	1.40-1.65	0.2-0.6	0.12-0.18	4.5-5.5	Moderate	0.28		
23B, 23C, 23D Mayodan	0-9	5-20	1.40-1.65	2.0-6.0	0.11-0.17	4.5-5.5	Low	0.24	4	.5-2
	9-39	35-60	1.25-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate	0.28		
	39-65	20-35	1.25-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
24B, 24C Meadows	0-4	7-27	1.35-1.55	2.0-6.0	0.10-0.16	5.1-6.5	Low	0.20	2	---
	4-9	7-27	1.40-1.60	2.0-6.0	0.07-0.16	5.1-6.5	Low	----		
	9-16	7-27	1.40-1.60	2.0-6.0	0.10-0.16	5.1-6.5	Low	----		
	16-24	---	---	---	---	---	-------------	----		
	24	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
25B-------------- Orange	0-10	10-27	1.25-1.55	0.6-2.0	0.14-0.20	5.1-6.0	Low----------	0.28	3	1-3
	10-28	35-60	1.35-1.65	<0.2	0.10-0.19	5.1-6.0	High---------	0.28		
	28-42	10-35	1.35-1.65	0.2-0.6	0.13-0.20	5.6-7.8	Low----------	0.28		
	42-55	---	---	---	---	---	-------------	----		
	55	---	---	---	---	---	-------------	----		
26B, 26D, 26E---- Pacolet	0-10	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-5.5	Low----------	0.20	3	.5-2
	10-27	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low----------	0.28		
	27-40	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low----------	0.28		
	40-65	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low----------	0.28		
27C3------------- Pacolet	0-10	20-35	1.30-1.50	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.24	2	.5-1
	10-27	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low----------	0.28		
	27-40	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low----------	0.28		
	40-65	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low----------	0.28		
28C, 28D--------- Pinkston	0-8	5-18	1.20-1.40	2.0-6.0	0.04-0.08	4.5-5.5	Low----------	0.17	2	.5-2
	8-18	10-18	1.20-1.50	2.0-6.0	0.06-0.18	4.5-5.5	Low----------	0.24		
	18-29	10-20	1.20-1.50	2.0-6.0	0.05-0.16	4.5-5.5	Low----------	0.24		
	29	---	---	---	---	---	-------------	----		
29C*, 29D*, 29E*:										
Pinkston--------	0-8	5-18	1.20-1.40	2.0-6.0	0.04-0.08	4.5-5.5	Low----------	0.15	2	.5-2
	8-18	10-18	1.20-1.50	2.0-6.0	0.06-0.18	4.5-5.5	Low----------	0.24		
	18-29	10-20	1.20-1.50	2.0-6.0	0.05-0.16	4.5-5.5	Low----------	0.24		
	29	---	---	---	---	---	-------------	----		
Mayodan---------	0-9	5-15	1.40-1.65	6.0-20.0	0.04-0.08	4.5-6.0	Low----------	0.17	4	.5-2
	9-39	35-60	1.25-1.45	0.6-2.0	0.10-0.17	4.5-5.5	Moderate-----	0.28		
	39-65	20-35	1.25-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.28		
30*. Pits, quarry										
31C, 31D--------- Poindexter	0-10	5-18	1.30-1.55	2.0-6.0	0.08-0.15	5.1-7.3	Low----------	0.28	3	.5-2
	10-18	20-35	1.35-1.45	0.6-2.0	0.13-0.19	5.1-7.3	Low----------	0.24		
	18-27	10-35	1.30-1.55	0.6-6.0	0.08-0.15	5.1-7.3	Low----------	0.24		
	27-55	---	---	---	---	---	-------------	----		
	55	---	---	---	---	---	-------------	----		
32C-------------- Rion	0-10	5-20	1.30-1.50	2.0-6.0	0.08-0.12	4.5-5.5	Low----------	0.24	3	.5-2
	10-35	18-35	1.40-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low----------	0.20		
	35-65	2-20	1.30-1.50	2.0-6.0	0.06-0.12	4.5-5.5	Low----------	0.20		
33A-------------- Riverview	0-11	10-27	1.30-1.60	0.6-2.0	0.16-0.24	5.1-6.5	Low----------	0.32	5	.5-2
	11-65	18-35	1.20-1.40	0.6-2.0	0.15-0.22	5.1-6.0	Low----------	0.24		
34B, 34C--------- Sheva	0-10	5-20	1.45-1.65	2.0-6.0	0.08-0.15	3.6-5.5	Low----------	0.20	3	.5-2
	10-29	20-34	1.55-1.70	0.2-0.6	0.13-0.19	3.6-5.5	Low----------	0.28		
	29-56	---	---	---	---	---	-------------	----		
	56	---	---	---	---	---	-------------	----		
35B-------------- State	0-9	5-15	1.25-1.40	0.6-6.0	0.08-0.15	4.5-5.5	Low----------	0.28	5	<2
	9-38	18-34	1.35-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low----------	0.28		
	38-65	2-15	1.35-1.50	>2.0	0.02-0.10	4.5-5.5	Low----------	0.17		
36B, 36C, 36D---- Stoneville	0-9	7-30	1.35-1.55	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.32	3	.5-2
	9-21	35-60	1.25-1.40	0.6-2.0	0.14-0.20	4.5-6.0	Moderate-----	0.28		
	21-43	10-35	1.30-1.45	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.24		
	43-65	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
37B, 37C, 37D, 37E--------------	0-6	12-27	1.10-1.40	0.6-2.0	0.10-0.17	4.5-5.5	Low----------	0.20	4	.5-2
Tatum	6-54	45-60	1.40-1.45	0.6-2.0	0.08-0.12	4.5-5.5	Moderate-----	0.28		
	54-65	---	---	---	---	---	-------------	----		
38A--------------	0-8	2-15	1.40-1.55	2.0-6.0	0.09-0.12	5.1-6.5	Low----------	0.10	4	1-2
Toccoa	8-65	2-18	1.40-1.50	2.0-6.0	0.09-0.12	5.1-6.5	-------------	----		
39*. Udorthents										
40*. Urban land										
41A--------------	0-6	6-40	1.35-1.50	0.6-2.0	0.15-0.24	4.5-7.3	Low----------	0.32	5	2-5
Wehadkee	6-31	18-35	1.30-1.50	0.6-2.0	0.16-0.20	4.5-7.3	Low----------	0.32		
	31-65	2-35	1.30-1.50	0.6-6.0	0.06-0.20	4.5-7.3	Low----------	0.24		
42B--------------	0-9	8-15	1.45-1.65	2.0-6.0	0.11-0.16	4.5-6.0	Low----------	0.24	5	.5-2
Wickham	9-43	18-35	1.30-1.50	0.6-2.0	0.12-0.17	4.5-6.0	Low----------	0.24		
	43-65	2-35	1.30-1.50	0.6-6.0	0.06-0.20	4.5-6.0	Low----------	0.24		
43C, 43D, 43E----	0-8	5-20	1.30-1.50	2.0-6.0	0.10-0.14	5.1-6.5	Low----------	0.17	1	.5-2
Wilkes	8-13	20-35	1.40-1.60	0.2-0.6	0.15-0.20	6.1-7.8	Moderate-----	0.32		
	13-48	---	---	---	---	---	-------------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro- logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard- ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
1B, 1C. Appling	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
2C, 2D, 2E. Ashlar	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
3A. Bolling	C	Rare	---	---	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate	High.
3B. Bolling	C	None	---	---	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate	High.
4B, 4C, 5B3, 5C3. Cecil	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
6B*, 6C*:											
Cecil	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Urban land	---	None	---	---	---	---	---	---	---	---	---
7A. Chenneby	C	Occasional	Very brief to long.	Dec-Apr	1.0-2.5	Apparent	Jan-Mar	>60	---	High	Moderate.
8A*:											
Chenneby	C	Frequent	Very brief to long.	Dec-Apr	1.0-2.5	Apparent	Jan-Mar	>60	---	High	Moderate.
Toccoa	B	Frequent	Brief	Dec-Apr	2.5-5.0	Apparent	Dec-Apr	>60	---	Low	Moderate.
9B, 9C. Creedmoor	C	None	---	---	1.5-2.0	Perched	Jan-Mar	>60	---	High	High.
10B, 11B3, 11C3. Cullen	C	None	---	---	>6.0	---	---	>60	---	High	Moderate.
12B, 12C, 12D. Enott	C	None	---	---	>6.0	---	---	40-60	Soft	High	Moderate.
13D. Goldston	C	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High.
14C*:											
Goldston	C	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High.
Tatum	B	None	---	---	>6.0	---	---	40-60	Soft	High	High.
15E*:											
Goldston	C	None	---	---	>6.0	---	---	10-20	Soft	Moderate	High.
Rock outcrop	D	None	---	---	---	---	---	0	Hard	---	---
16B, 16C. Helena	C	None	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	High	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
17B, 18B3, 18C3, 19B, 19C: Hiwassee	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
20B: Leaksville	D	None	---	---	0-1.0	Perched	Dec-Mar	24-60	Hard	Moderate	Low.
21D, 21E: Madison	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
22B, 22C: Mattaponi	C	None	---	---	3.0-6.0	Perched	Dec-Mar	>60	---	High	High.
23B, 23C, 23D: Mayodan	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
24B, 24C: Meadows	D	None	---	---	>6.0	---	---	10-20	Soft	Low	High.
25B: Orange	D	None	---	---	1.0-3.0	Perched	Dec-May	40-60	Soft	High	Moderate.
26B, 26D, 26E, 27C3: Pacolet	B	None	---	---	>6.0	---	---	>60	---	High	High.
28C, 28D: Pinkston	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
29C*, 29D*, 29E*: Pinkston	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
Mayodan	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
30*. Pits, quarry											
31C, 31D: Poindexter	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
32C: Rion	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
33A: Riverview	B	Occasional	Brief	Dec-Mar	3.0-5.0	Apparent	Dec-Mar	>60	---	Low	Moderate.
34B, 34C: Sheva	C	None	---	---	1.5-2.0	Perched	Dec-Apr	20-40	Soft	High	High.
35B: State	B	Rare	---	---	4.0-6.0	Apparent	Dec-Jun	>60	---	Moderate	High.
36B, 36C, 36D: Stoneville	B	None	---	---	>6.0	---	---	40-60	Soft	High	High.
37B, 37C, 37D, 37E: Tatum	B	None	---	---	>6.0	---	---	40-60	Soft	High	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
38A---------------- Toccoa	B	Occasional	Brief-----	Dec-Mar	2.5-5.0	Apparent	Dec-Apr	>60	---	Low------	Moderate.
39*. Udorthents											
40*. Urban land											
41A---------------- Wehadkee	D	Frequent----	Brief-----	Nov-Jun	0-1.0	Apparent	Nov-May	>60	---	High-----	Moderate.
42B---------------- Wickham	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
43C, 43D, 43E----- Wilkes	C	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Appling	Clayey, kaolinitic, thermic Typic Kanhapludults
Ashlar	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Bolling	Fine-loamy, mixed, thermic Aquic Hapludalfs
Cecil	Clayey, kaolinitic, thermic Typic Kanhapludults
Chenneby	Fine-silty, mixed, thermic Fluvaquentic Dystrochrepts
Creedmoor	Clayey, mixed, thermic Aquic Hapludults
Cullen	Clayey, mixed, thermic Typic Hapludults
Enott	Fine, mixed, thermic Typic Hapludalfs
Goldston	Loamy-skeletal, siliceous, thermic, shallow Typic Dystrochrepts
Helena	Clayey, mixed, thermic Aquic Hapludults
Hiwassee	Clayey, kaolinitic, thermic Rhodic Kanhapludults
*Leaksville	Fine, montmorillonitic, thermic Typic Albaqualfs
Madison	Clayey, kaolinitic, thermic Typic Kanhapludults
Mattaponi	Clayey, mixed, thermic Typic Hapludults
Mayodan	Clayey, mixed, thermic Typic Hapludults
Meadows	Loamy, mixed, thermic, shallow Umbric Dystrochrepts
Orange	Fine, montmorillonitic, thermic Albaquic Hapludalfs
Pacolet	Clayey, kaolinitic, thermic Typic Kanhapludults
Pinkston	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Poindexter	Fine-loamy, mixed, thermic Typic Hapludalfs
Rion	Fine-loamy, mixed, thermic Typic Hapludults
Riverview	Fine-loamy, mixed, thermic Fluventic Dystrochrepts
Sheva	Fine-loamy, mixed, thermic Aquic Hapludults
State	Fine-loamy, mixed, thermic Typic Hapludults
Stoneville	Clayey, mixed, thermic Typic Rhodudults
Tatum	Clayey, mixed, thermic Typic Hapludults
Toccoa	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Udorthents	Udorthents
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents
Wickham	Fine-loamy, mixed, thermic Typic Hapludults
Wilkes	Loamy, mixed, thermic, shallow Typic Hapludalfs

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